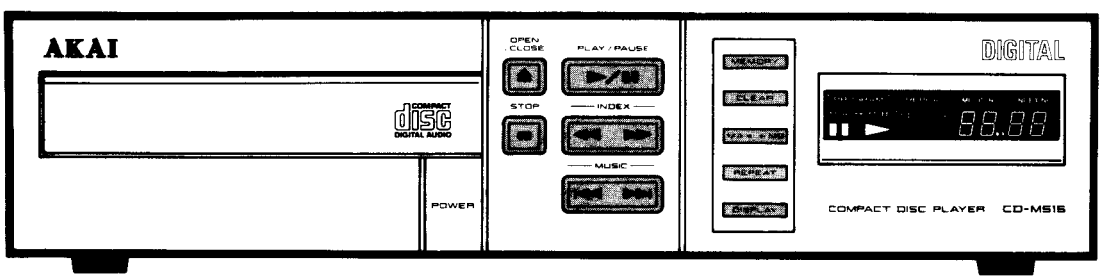
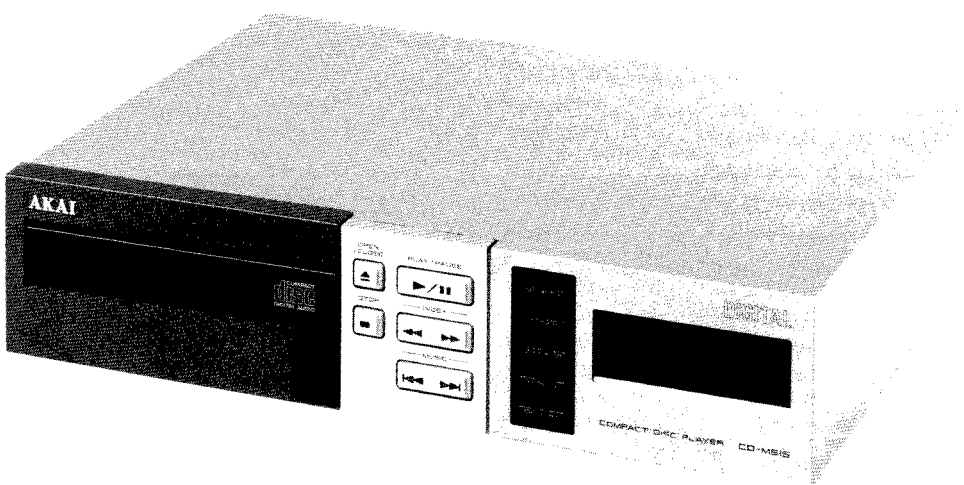
CD-M515

AKAI SERVICE MANUAL



COMPACT DISC PLAYER

MODEL CD-M515



MODEL CD-M515

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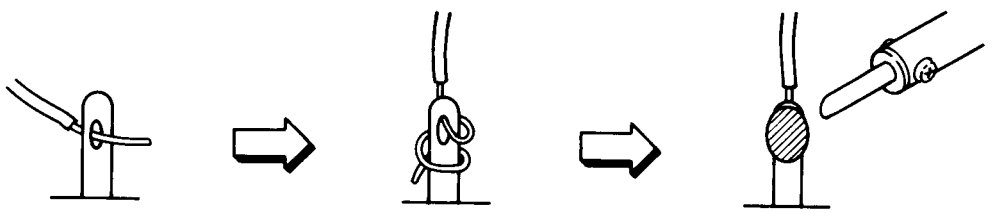
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for [C] or [A], specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks. line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

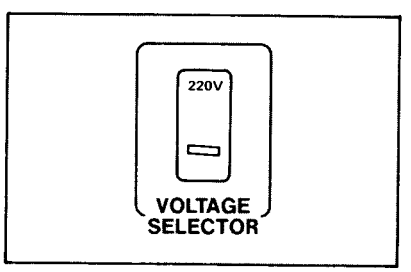
1. Parts identified by the ⚠ symbol parts are critical for safety.
   Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
   Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers (Insulating Barriers)
   4) Insulation sheets for transistors
   5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

VOLTAGE CONVERSION

Models for Canada, Europe, UK and Australia are not equipped with this facility. Each machine is preset at the factory according to destination, but some machines can be set to 110V – 120V or 220V – 240V, 120V or 230V as required. If your machine's voltage can be converted: Turn the voltage selector, located on the back panel, with a screwdriver until the correct voltage is indicated.



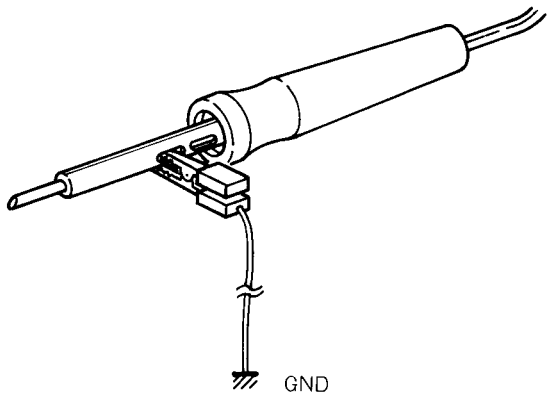
CYCLE CONVERSION

Cycle conversion is not necessary, since CD-M515 uses DC motors.

PRECAUTIONS IN REPAIRING

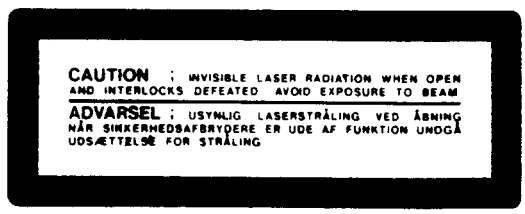
When repairing or adjusting the unit, please note the following points.

1. Do not put excessive pressure on the mechanical part (operation part), including the pick-up block, as extremely high mechanical precision is required in these parts.
2. When the base is removed for repair or adjustment, make sure that there are no metal objects in the narrow gap between the P.C. board or the mecha parts and the base.
3. The Micro-Computer (M50745-412SP) and the CD signal processing ICs (CX2018, CX2019, CX20133, CX23035 and CXK5816P-15L) can be damaged by static electricity or leakage from a soldering iron during repairing.
   While soldering, please take the precautions against leakage as in the illustration.
4. Do not loosen any screws in the pick-up block.
   When handling the pick-up block, please refer to the points to NOTE when replacing the pick-up block.
5. Keep safety for hazardous invisible Laser Radiation, DO NOT watch the Laser Beam (Objective Lens) directly.
6. Models for the same countries, Laser Warning Labels are affixed on the unit and inside of the unit, as shown below.
   Read it carefully for your safety, when repairing or adjusting the unit.



[DENMARK]

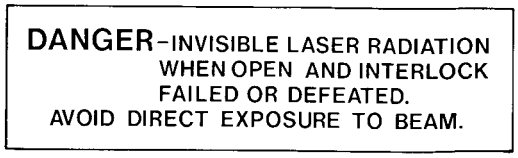
A Label affixed on the unit


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED AVOID EXPOSURE TO BEAM
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSÆTTELSE FOR STRÅLING

A1 A Label affixed inside of the unit

[USA]

A Label affixed on the unit



A1 A Label affixed inside of the unit

SECTION 1

SERVICE MANUAL

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I. SPECIFICATIONS

MODEL CD-M515

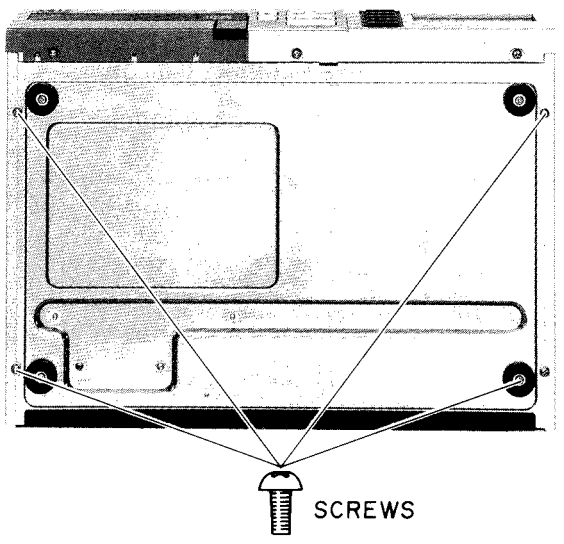
Sensor type	Optical
Pick-up system	3 beam semi-conductor laser
Channel	2
Sampling frequency	44.1 kHz
Frequency response	5 to 20,000 Hz
Dynamic range	90 dB
S/N ratio	90 dB
T.H.D.	0.006% (1 kHz)
Channel separation	86 dB (1 kHz)
Wow & flutter	Below measurable limits
Access time	2.6 sec
Line output level	2V
Power requirements	AC100V 50/60 Hz for Japan AC120V 50 Hz for USA & Canada AC220V 50 Hz for Europe except UK AC240V 50 Hz for UK & Australia AC110/120/220/240V, 50/60 Hz convertible for other countries
Power consumption	10W
Dimensions	350 (W) × 85 (H) × 260 (D) mm (13.8 × 3.3 × 10.2 inches)
Weight	3.2 kg (7.0 lbs)

*For improvement purposes, specifications and design are subject to change without notice.

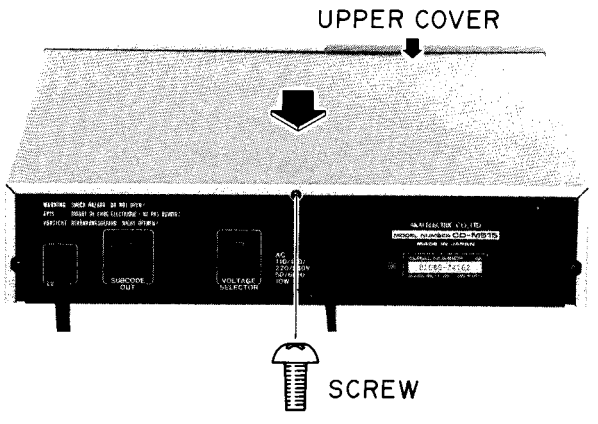
II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs.
Reassemble in reverse order.

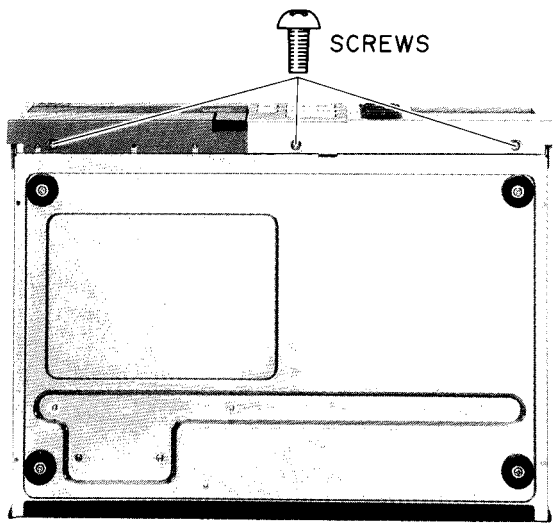
1



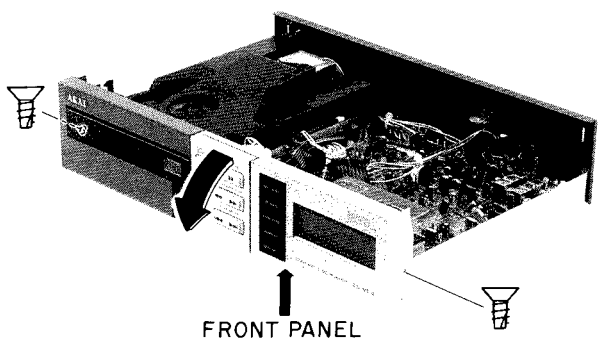
2



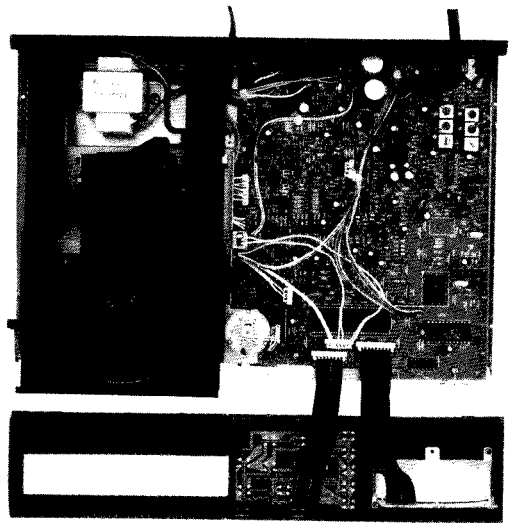
3



4



5



NOTE: The unit used for picture is Japan type.

III. CONTROLS

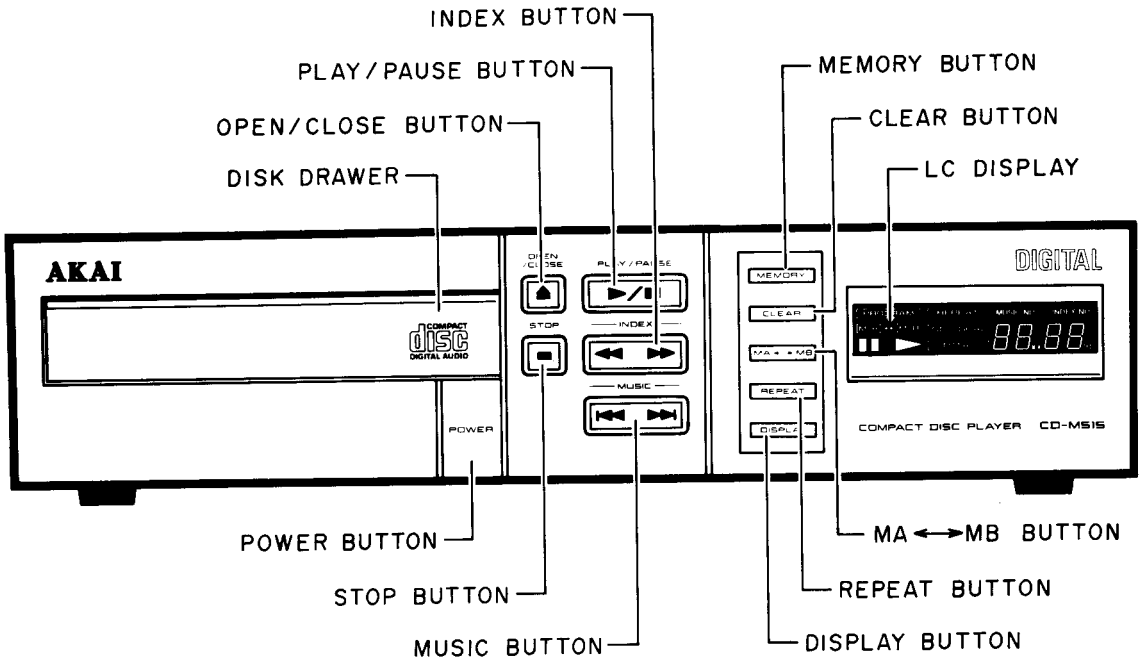


Fig. 3-1 Front View

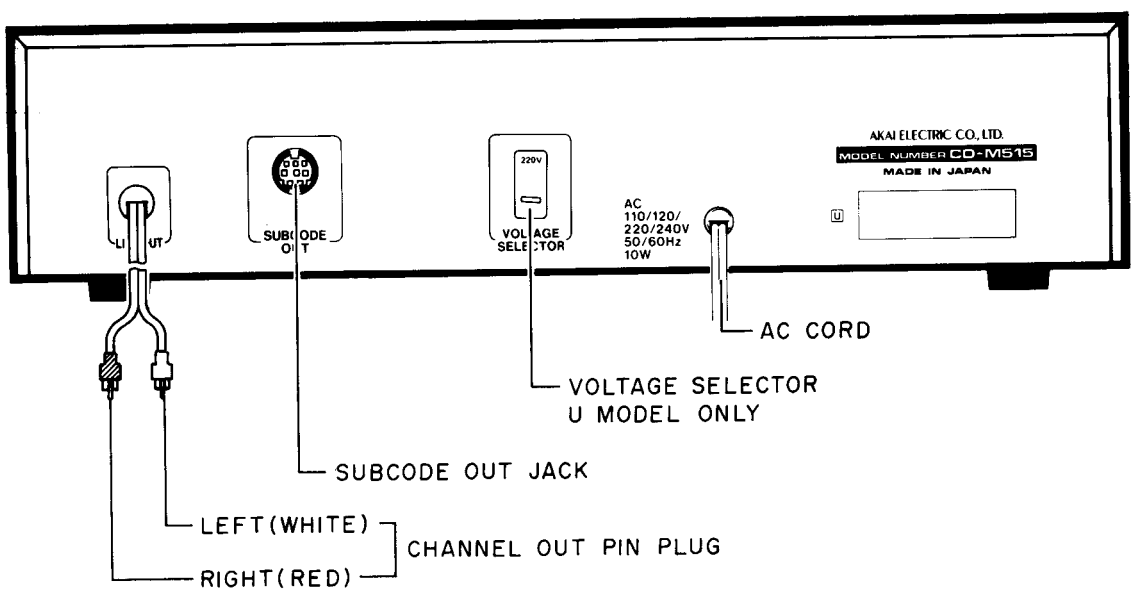


Fig. 3-2 Rear View

IV. PRINCIPAL PARTS LOCATION

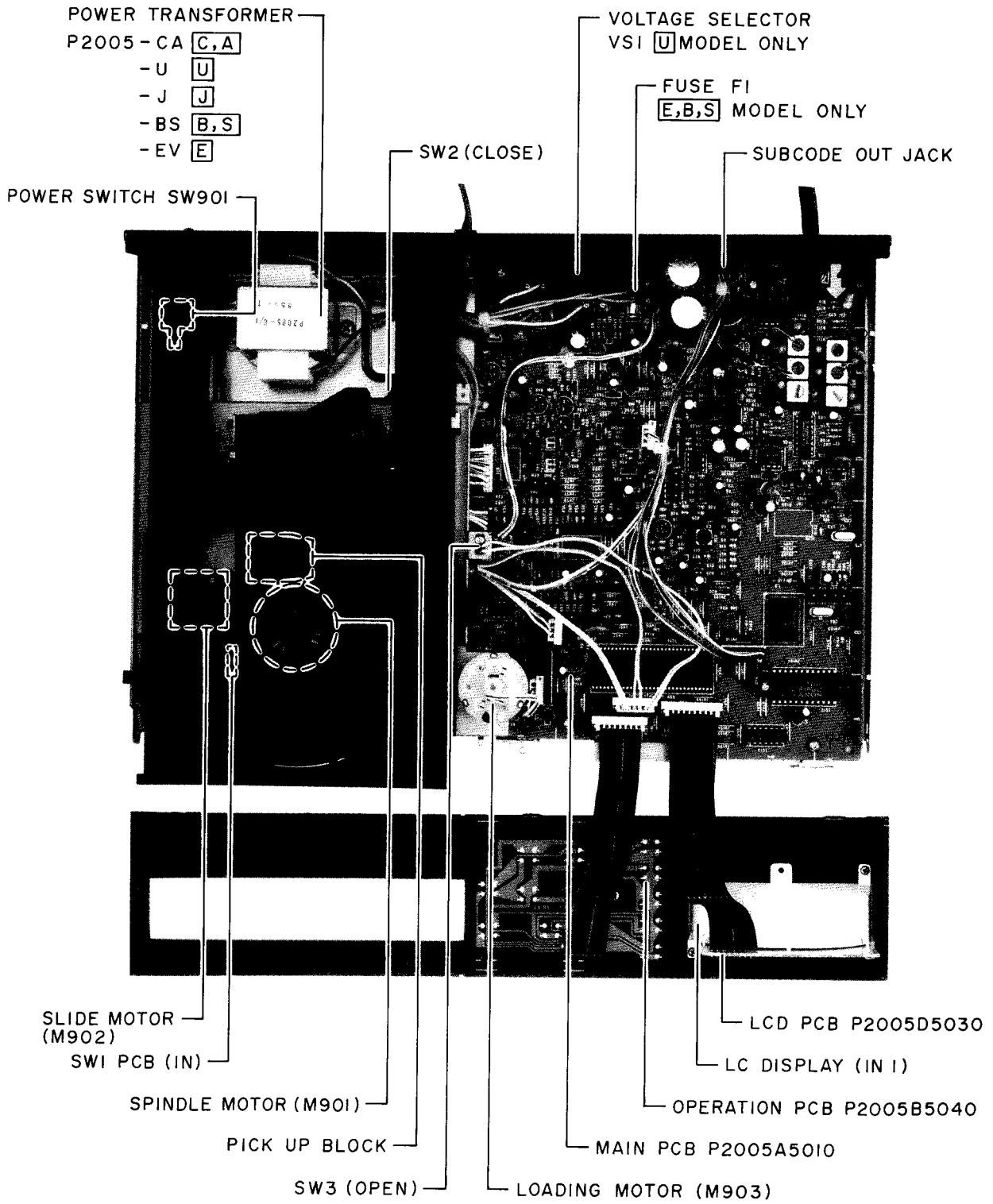


Fig. 4-1 Top View

V. REPLACEMENT OF THE PICK-UP BLOCK

5-1. PRECAUTIONS, WHEN REPLACING THE PICK-UP BLOCK

1) The LD (Laser Diode) fixed on the pick-up block P.C. board can be damaged by static electricity or leakage from a soldering iron. Do not touch the P.C. board of the pick-up block, or use a tester to check if the electricity is on. When soldering, make sure that precautions are taken to prevent leakage from the soldering iron.
2) Avoid scratches, dirt or dust on the lens of the pick-up caused by touching with the fingers.
3) When connecting or disconnecting the Black connector (P2), make sure that the P.C. board is shorted circuit as shown in Fig. 5-1.
   Do not turn the electricity "ON" while it remains short-circuited.
4) For your safety from hazardous invisible Laser Radiation, replace only with pick-up block. Do not try to repair or the any adjustment.

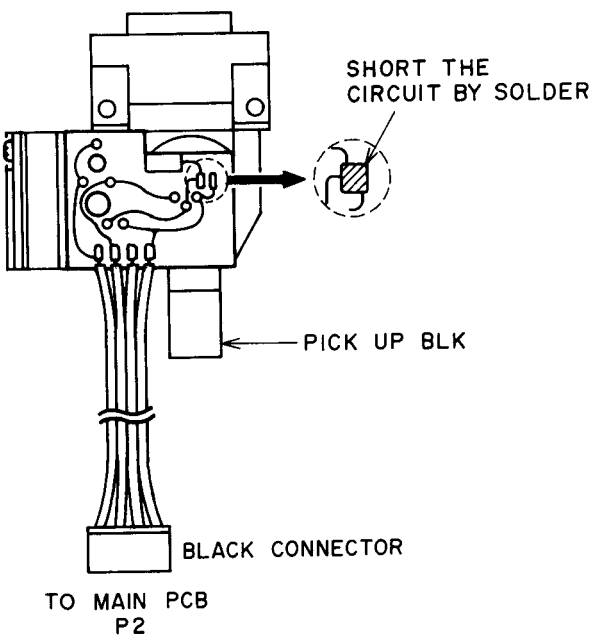


Fig. 5-1

5-2. PROCEDURES FOR CHANGING THE PICK-UP BLOCK

NOTE:
Keep your safety from hazardous invisible Laser Radiation, make sure that the power switch is OFF when removing the disk clamper.

1) Remove the upper cover and the front panel and turn the power on. Depress the OPEN/CLOSE button to open the disk tray. Then turn the power off.
2) Remove four Mecha chassis fixing screws A. (Refer to Fig. 5-2)
3) Short the pick-up P.C. board with solder. (Refer to Fig. 5-1)
4) Loosen two pick-up fixing screws B, remove the pick-up gear. (Refer to Fig. 5-3)
5) Remove the three connectors on the pick-up block: P1, 2 and 3.
6) Move the disk clamper.
7) When the four screws A, B, C and D, for the metal fittings of the pick-up guide rail are removed, the pick-up block guide rail can be removed.
   (Refer to Fig. 5-4)

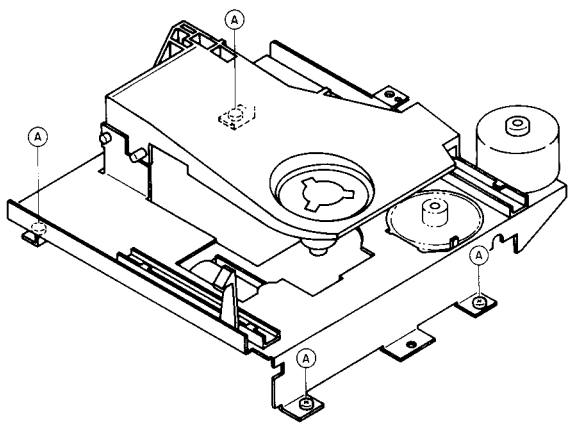


Fig. 5-2

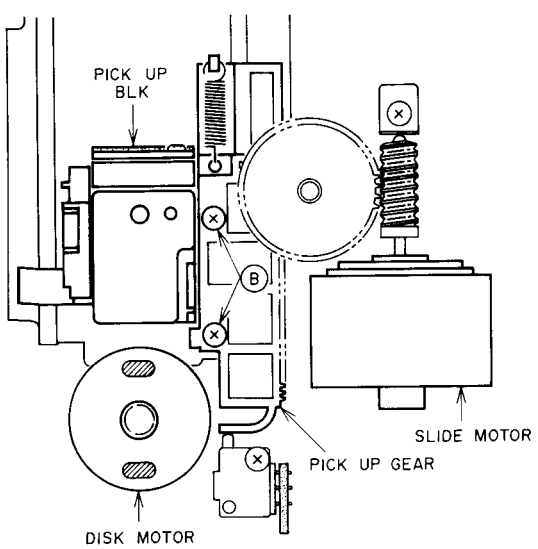


Fig. 5-3

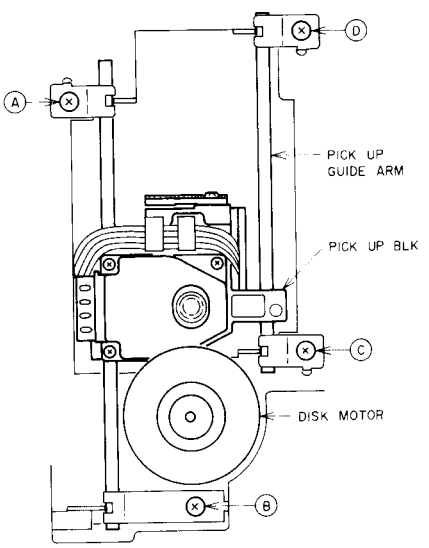


Fig. 5-4

VI. REPLACEMENT OF SPINDLE MOTOR

The turntable of the spindle motor has been pressed-in and they can not be replaced individually. When replacing the turntable or the spindle motor, replace the following parts as a set.

PARTS NO.	DESCRIPTION
BM-361225	MOTOR (SPINDLE)
MZ-362964	TURNTABLE
ZS-624870	HEXAGON SET SCREW

6-1. REMOVE AND ASSEMBLE SPINDLE MOTOR

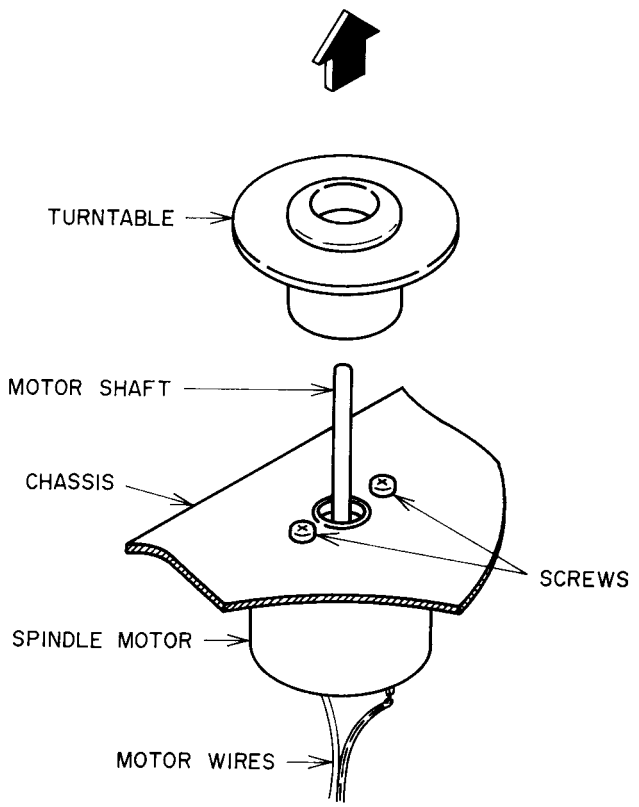


Fig. 6-1

1) Pull out the turntable from the spindle motor.
2) Remove two screws.
3) Unsolder two spindle motor wires.
4) Solder two wires to the new spindle motor.
5) Put the new spindle motor on to the chassis with two screws.
6) Put the new turntable on to the motor shaft and adjust the turntable so that the height of the turntable from chassis becomes 20 mm or its clearance from chassis becomes 4 mm as shown in Fig. 6-2.

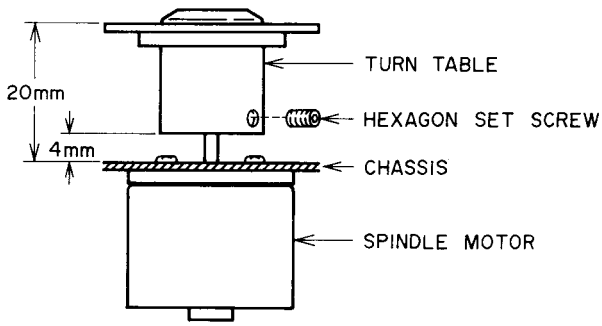


Fig. 6-2

VII. ADJUSTMENT

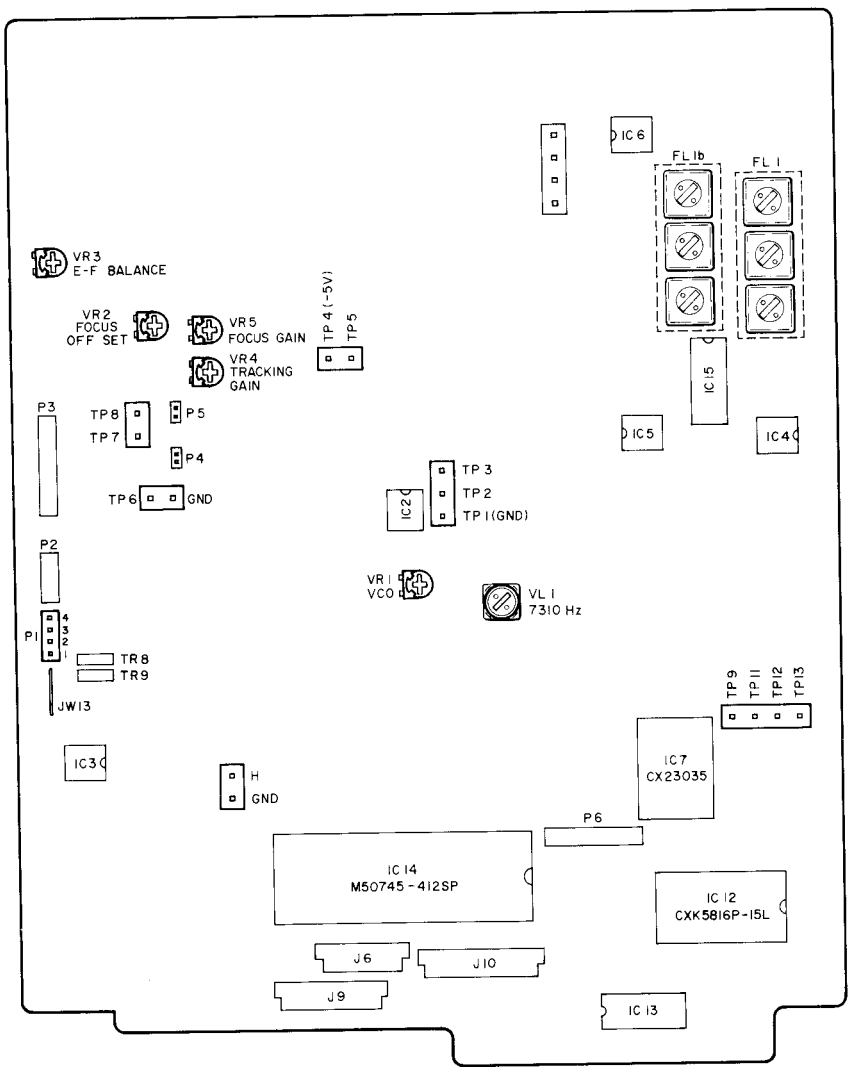


Fig. 7-1

7-1. ADJUSTMENT WHEN CHANGING THE PICK-UP

Change the pick-up, following the procedures in the V. REPLACEMENT OF THE PICK-UP BLOCK and when replacement is complete, turn the short terminal of the LD (Laser Diode) to open.

7-1-1. OPTICAL AXIS ADJUSTMENT

If the mechanical eccentricity is large when fixing the pick-up tracking errors become large.
This in turn interferes with the tracking servo, so optical axis adjustment is necessary.

1) Disconnect P4 on the Main P.C. board (to turn the tracking servo off).
2) Connect an oscilloscope to TP7 on the Main P.C. board.
3) Place the normal music disc, then play back the first music on it and observe the waveform of TP7.
4) Turn the adjustment screw A by degrees (Refer to Fig. 7-2) as waveform (Refer to Fig. 7-3) of TP7 will become maximum.

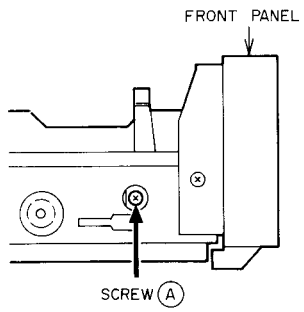


Fig. 7-2

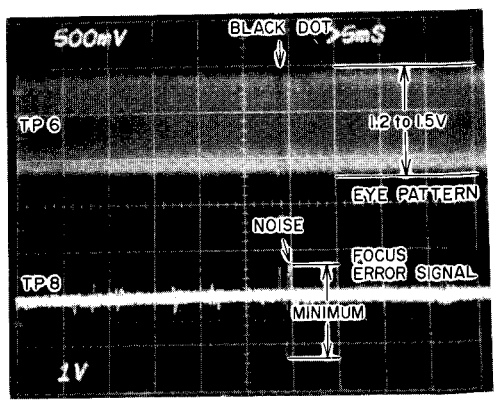


Fig. 7-3

* When it is difficult to observe maximum point of the waveform, use the following rectifier circuit as shown in Fig. 7-4.
  Observe a change in DC voltage through above rectifier with oscilloscope and adjust the optical axis so that the DC voltage reading become maximum.

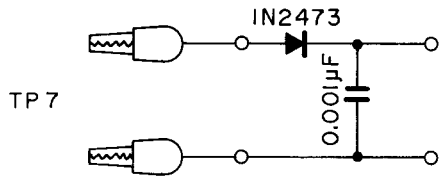


Fig. 7-4

7-1-2. READJUSTMENT OF E-F BALANCE

When the pick-up is changed, E-F balance adjustment must be performed.
Refer to item 7-2-4 for adjustment.

7-1-3. CHECKING THE ELECTRIC CURRENT OF THE LASER

The electric current of the laser is indicated on the labels on the pick-up.

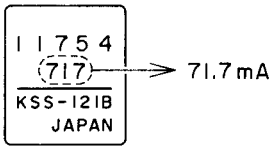


Fig. 7-5

1) Connect the millivoltmeter between TP4 and TP5 on the Main P.C. board and measure the voltage.

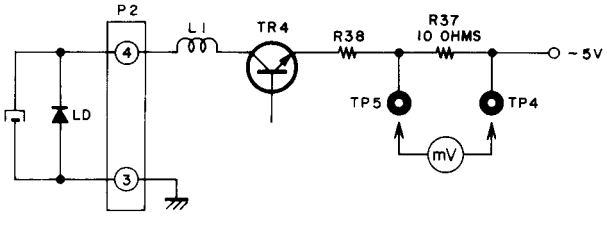


Fig. 7-6

2) Calculate the electric current of the laser from the voltage measured and check that is within ±4 mA of the recommended value.
  Electric current of the laser = Voltage measured ÷ 10.

  If the electric current of the laser exceeds ±4 mA of the recommended value, change the pick-up again.

7-1-4. APC (AUTOMATIC POWER CONTROL) CIRCUITRY

This is a servo circuit to maintain the LD (Laser Diode) power of the pick-up. The LD power has been adjusted by VR1 (on the pick-up block) at manufacture.
Keep safety from hazardous invisible Laser Radiation, do not touch this VR1.

7-2. SERVO ADJUSTMENT

Servo adjustment is an adjustment to the control circuitry for accurate and safe disc play back. When adjusting use a SONY TYPE 3 (No. YEDS 7) or PHILIPS (No. 410056-2 or 400079-2) as a test disc.

7-2-1. VCO FREQUENCY ADJUSTMENT

1) Connect a short wire between TP2 and TP1 (GND).
2) Connect a frequency counter to TP9.
3) Adjust VL1 so that the frequency is 7,310 ± 10 Hz.

7-2-2. VCO ADJUSTMENT

1) Connect an oscilloscope to TP12 on the Main P.C. board.
2) Insert the SONY TEST DISC TYPE-3, then depress the OPEN/CLOSE button to close the disc tray.
3) The total music number selections on the test disc will be displayed on the LC display.
4) Play back the test disc and adjust VR1 so that the error flags are at minimum.

Fig. 7-7

7-2-3. FOCUS OFF-SET ADJUSTMENT

1) Connect the oscilloscope to TP6 and TP8 on the Main P.C. board.
  TP6 ..... Eye pattern waveform
  TP8 ..... Focus error signal

2) Play back the Track No. 17 of PHILIPS TEST DISC and adjust the VR2 so that the noise is at minimum.

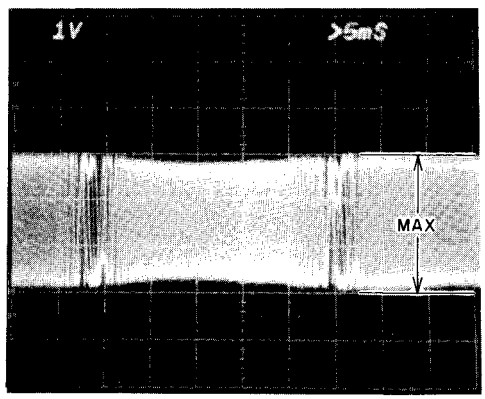


Fig. 7-8

7-2-4. E-F BALANCE ADJUSTMENT

This is to adjust the output balance of diodes E and F for tracking error detection.

When changing the pick-up adjusting the tracking constancy, this must be checked and adjusted.

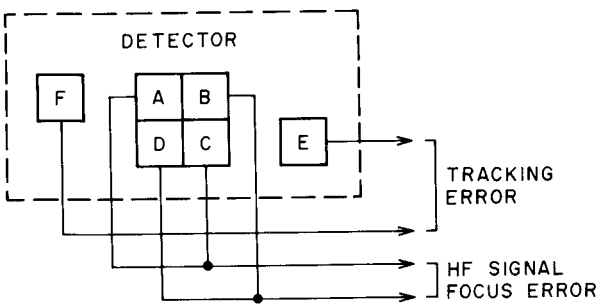


Fig. 7-9

1) Connect the oscilloscope to TP7 on the Main P.C. board.
   Measure direct current voltage via an integral circuitry between TP7 and the oscilloscope as in illustration in Fig. 7-10.

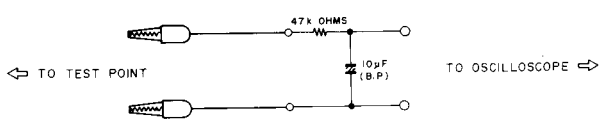


Fig. 7-10

2) Play back the test disc and turn the machine to pause.
3) Extract the short plug (P4) on the Main P.C. board.
4) Adjust the VR1 for E-F balance so that the ground level is center of the waveform.

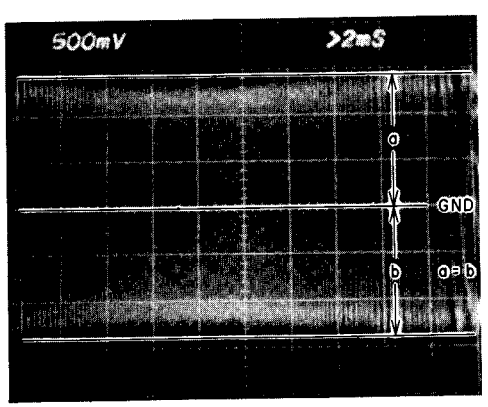


Fig. 7-11

7-2-5. FOCUS GAIN ADJUSTMENT

1) Connect the oscilloscope between P1-pin 1 terminal on the Main P.C. board and earth, and measure the voltage on the focus coil.
2) Play back the test disc and adjust VR5 so that the tracking coil voltage is 500 to 600 mVp-p.

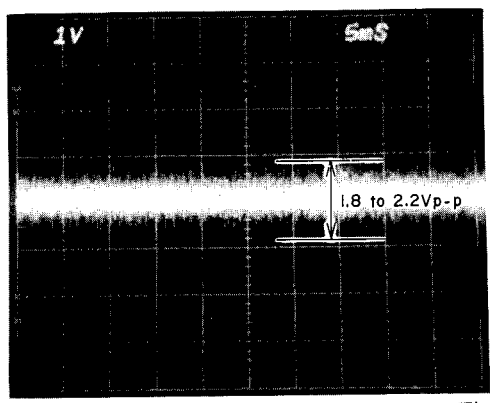


Fig. 7-12

7-2-6. TRACKING GAIN ADJUSTMENT

1) Connect the oscilloscope between P1-pin 3 terminal on the Main P.C. board and measure the voltage on the tracking coil.
2) Play back the test disc and adjust VR4 so that the tracking coil voltage is 1.8 to 2.2 Vp-p.

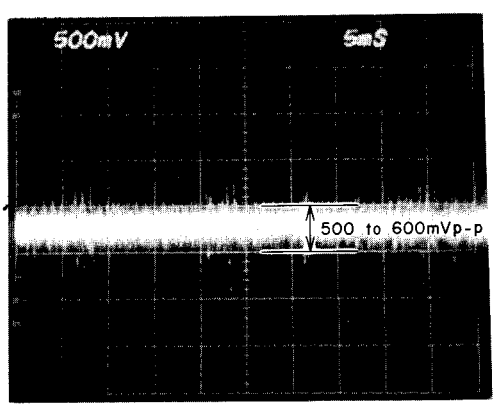


Fig. 7-13

REFERENCE:

If the sound jumps when the machine is lightly jolted, this means the tracking gain is small.

If a disc with a scratch of 600μ is played and the sound jumps, this means the tracking gain is large.

Philips No. 40079-2 Track No. 6, 01'05" up till Track No. 7, 00'02".

VIII. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

PC BOARD TITLE		PC BOARD NUMBERS	REMARKS
MAIN	PC BOARD	P2005A501A-503A	
OPERATION (A)	PC BOARD	P2007B504A	
OPERATION (B)	PC BOARD	P2007B504B	
LCD	PC BOARD	P2005B5040	

SECTION 2

PARTS LIST

TABLE OF CONTENTS

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2. PC BOARD BLOCK 19
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6. LCD PC BOARD 20
7. ASSEMBLY BLOCK 21
8. FINAL ASSEMBLY BLOCK 22
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ATTENTION

1. When placing an order for parts, be sure to list Part No., Model No. and the description of each part. Otherwise, the non-delivery of the part or the delivery of a wrong part may result.
2. Please make sure that Part No. is correct when ordering.
If not, a part different from the one you ordered may be delivered.
3. Since the parts shown in Parts List of Preliminary Service Manual may have been the subject of changes, please use this Parts List for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List lists those parts which are considered necessary for repairs. Other common parts, such as resistors and capacitors, are listed in the "Common List for Service Parts" from which these parts should be selected and stocked.
2. The Recommended Spare Parts List shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
4. How to read the Parts List.

a) Mechanism Block

2. HEAD BASE BLOCK

REF. NO.	PART NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20×03STL CMT
2-4	ZS-536488	BID20×08STL CMT
2-5	ZG-402895	SP CS ANGLE ADJUST

- SP (Service Parts) Classification
- A small "x" indicates that this part is not shown in the Photo or Illustration.
- This number corresponds with the individual parts index number in that figure.
- This number corresponds with the Figure Number.

b) PC Board

6. MAIN PC BOARD

REF. NO.	PART NO.	DESCRIPTION
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-C1A	EC-338399	C MMY V 223M 250AC [U,E,B,S]
6-C1B	EC-350949	C MMY V 223M 250DC [J]
6-C1C	EC-338397	C MMY V 223M 125AC [C,A]
6-X1	EI-318384	OSC X'TAL NC-18C

- Symbols for primary destination
  [A]: AAL(U.S.A.) [S]: SAA(Australia)
  [B]: BEAB(England) [U]: U/T(Universal Area)
  [C]: CSA(Canada) [V]: VDE(W. Germany)
  [E]: CEE(Europe) [Y]: Custom Version
  [J]: JPN(Japan)
- SP (Service Parts) Classification
- These reference symbols correspond with component symbols in the Schematic Diagrams.

The available PC Board Blocks are listed separately.

5. When Part No. is known, Parts Index at end of Parts List can be used to locate where that part is shown in Parts List by its Reference No. listed at right of Part No.

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS

AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÉCES RECOMMANDEES PAR LÉ FABRICANT

RECOMMENDED SPARE PARTS LIST

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

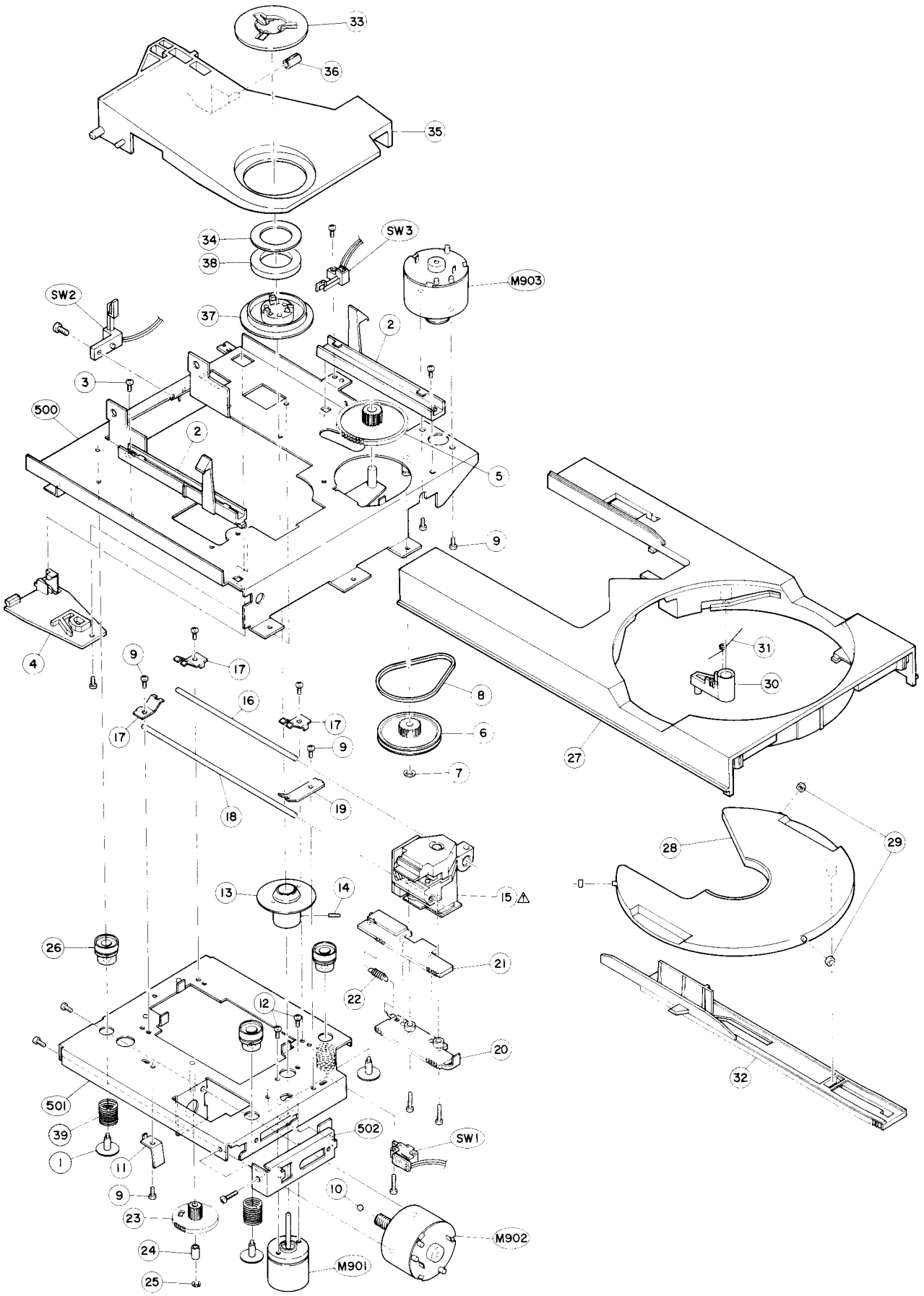
REF. NO.		PART NO.	DESCRIPTION
1	N	BM-P2005A110A	LOADING MOTOR BLK CD-M515
2	N	BM-P2005A140A	SLIDE MOTOR BLK CD-M515
3	N	BM-361225	SPINDLE MOTOR RF-310TB-11400
4		BO-359294	⚠ PICK UP KSS-121B
5	N	BT-361204	⚠ TRANS POWER P2005-A, C (C, A)
6	N	BT-361206	⚠ TRANS POWER P2005-B, S (B, S)
7	N	BT-361205	⚠ TRANS POWER P2005-E, V (E)
8	N	BT-361202	⚠ TRANS POWER P2005-J (J)
9	N	BT-361201	⚠ TRANS POWER P2005-U/T (U)
10		ED-301911	D SILICON H DS448
11		ED-344280	D SILICON H GMA-01-FY2 F05
12		ED-306109	D SILICON W03B 100/1.0A
13		ED-353692	D VARACTER SVC321 C, D DOUBLE
14		ED-331617	D ZENER H HZ6 A3
15		ED-300035	D ZENER H HZ6 B3
16		ED-319167	D ZENER H HZ6 C3
17		ED-201581	D ZENER H HZ7 B1
18		EF-601964	⚠ FUSE SEMKO T 1.60A 250V (E, B, S)
19		EI-330352	IC BA6109
20	N	EI-361234	IC CX 20108
21	N	EI-361235	IC CX 20133
22	N	EI-361233	IC CX 20109
23	N	EI-361235	IC CXK5816P-15L
24	N	EI-361232	IC CX23035
25	N	EI-361230	IC LC7580
26		EI-355863	IC MB84053B
27	N	EI-361237	IC M50745
28		EI-349719	IC M5218P
29	N	EI-362588	IC M5238P
30		EI-304657	IC TC4011BP
33	N	EI-361223	OSC X'TAL NR-18 35.002000MHz
34	N	EI-361222	OSC X'TAL NR-18 8.467200MHz
35	N	EL-361231	PL SOCKET 14.0V 100MA
36	N	EM-361229	IND LCD 9421P
37	N	EO-361227	COIL VARI 1 A119AN-16737Z
38	N	EO-362920	COIL VARI 1 25-5430-13 WHITE
39	N	EO-362921	COIL VARI 1 25-562920 COIL VARI 1 25-5430-13 WHITE
39	N	EO-362921	COIL VARI 1 25-5431-13 RED
40	N	EO-362922	COIL VARI 1 25-5432-13 BLACK
41		ES-344274	⚠ SW SELECTOR HXW 0244-01-060 01-4 (U)
42	N	ES-362933	SW LEAF MSW-1294NBK
43		ES-344257	SW LEAF MSW-1418L 01-1 NO
44		ES-337902	SW PUSH SDLD1P002 01-1
45		ES-355842	SW SLIDE SSCTP1026A 01-2
46		ES-349474	SW TACT SKHHAM004A
47		ET-345626	⚠ TR 2SA1248 S, T
48		ET-354841	⚠ TR 2SA1282A F, G F05
49		ET-322598	⚠ TR 2SB632K E, F
50		ET-318237	⚠ TR 2SB764 E, F
51		ET-345625	⚠ TR 2SC3116 S, T
52		ET-357845	⚠ TR 2SC3242A F, G F05
53		ET-310148	⚠ TR 2SD612K E, F
54		ET-354897	TR FET 2SK170 BL, GR, V
55		ET-308472	TR 2SA1115 E, F, G F05
56		ET-349718	TR 2SA1392 S, T
57		ET-308141	TR 2SC2603 G F05
58		ET-349081	TR 2SC3383 S, T
59		ET-200986	TR 2SD863-V8 F
60		EV-358829	R S-FIX H RH0615CJ4J 3P 223
61		EV-356583	R S-FIX H RH0615CN3J 3P 332
62		EV-356577	R S-FIX H RH0615C14J 3P 103
63		EV-357619	R S-FIX H RH0615C15J 3P 104
64	N	MB-362932	BELT LOADING
65		MR-352158	PULLEY GEAR
66	N	MZ-359769	GEAR LOADING
67	N	MZ-359760	GEAR PICK UP (A)
68	N	MZ-359761	GEAR PICK UP (B)
69	N	MZ-359839	GEAR RACK
70	N	MZ-359762	GEAR WHEEL (A)
71	N	MZ-359767	HOLDER RAIL
72	N	MZ-362964	TURN TABLE CD

"NOTE" N: New Parts

SYMBOL FOR DESTINATION

[A]: AAL (U.S.A)
[B]: UK (ENGLAND)
[C]: CSA (CANADA)
[E]: CEE (EUROPE)
[J]: JPN (JAPAN)
[S]: SAA (AUSTRALIA)
[U]: U/T (UNIVERSAL AREA)

MECHA BLOCK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SW3
M903
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M902
M901

1. MECHA BLOCK

REF. NO.	PART NO.	DESCRIPTION
1-1	ZS-366253	SCREW
1-2	MZ-359767	HOLDER RAIL
1-3	ZS-432843	PAN26 × 04STL CMT
1-4	MZ-359768	STOPPER TRAY
1-5	MZ-359769	GEAR LOADING
1-6	MR-352158	PULLEY GEAR
1-7	ZW-357164	RING E 230SUP CMT
1-8	MB-362932	BELT LOADING
1-9	ZS-592378	PAN26 × 03STL CMT
1-10	MV-368886	BALL 300STL
1-11	ZG-351817	SP PLATE THRUST
1-12	ZS-608095	PAN20 × 05STL CMT
* 1-13	MZ-362964	TURN TABLE CD
* 1-14	ZS-624870	6SET20 × 040SCM PKR HP
1-15	BO-359294	⚠ PICK UP KSS-121B
1-16	MS-359759	SHAFT SUB
1-17	MZ-351814	HOLDER SHAFT (A)
1-18	MS-351813A	SHAFT (A)
1-19	MZ-359836	HOLDER SHAFT (B)
1-20	MZ-359760	GEAR PICK UP (A)
1-21	MZ-359761	GEAR PICK UP (B)
1-22	ZG-357808	SP T6-03.2/0.29-11.2 T6-059
1-23	MZ-359762	GEAR WHEEL (A)
1-24	TC-676844	SPACER 3 × 6
1-25	ZW-270088	RING E190SUP CMT
1-26	MB-363112	CUSHION RUBBER (B)
1-27	SC-361087	COVER DISC TRAY
1-28	SZ-359775	HOLDER DISC
1-29	MR-345158	ROLLER
1-30	ML-359833	LEVER LOCK
1-31	ZG-359830	SP TORSION LEVER
1-32	MZ-359839	GEAR RACK
1-33	SC-359770	CAP CLAMP
1-34	MZ-361943	PLATE
1-35	MZ-359837	HOLDER CLAMPER
1-36	MH-639281	SPACER 3 × 8
1-37	MZ-359766	CLAMPER
1-38	MZ-362855	MAGNET FM27 × 17 × 3
1-39	ZG-366252	SP PUSH CUSHION
* 1-M901	BM-361225	SPINDLE MOTOR RF-310TB-11400
1-M902	BM-P2005A140A	SLIDE MOTOR BLK CD-M515
1-M903	BM-P2005A110A	LOADING MOTOR BLK CD-M515
1-SW1	ES-355842	SW SLIDE SSCTP1026A 01-2
1-SW2	ES-362933	SW LEAF MSW-1294NBK
1-SW3	ES-344257	SW LEAF MSW-1418L 01-1 NO

NOTE: Parts listed in 1-1 to 1-SW3 on the exploded view and list are normally stocked for replacement purpose.
The remaining parts shown in this manual are not normally stocked, because they are seldom required for routine service.

NOTE * : When repairing 1-M901 (SPINDLE MOTOR) or 1-13 (TURN TABLE CD), replace the following items as a set.
- 1-M901 (SPINDLE MOTOR)
- 1-13 (TURN TABLE CD)
- 1-14 (6 SET 20 × 040 SCM PKR HP)

2. PC BOARD BLOCK

REF. NO.	PART NO.	DESCRIPTION
2-1	BA-P2005A020B	PC MAIN BLK CD-M515 (J)
2-1A	BA-P2005A020A	PC MAIN BLK CD-M515 (U)
2-1B	BA-P2005A020C	PC MAIN BLK CD-M515 (C, A)
2-1C	BA-P2005A020D	PC MAIN BLK CD-M515 (E, B, S)
2-2	BA-P2005A090A	PC LCD BLK CD-M515

3. MAIN PC BOARD

REF. NO.	PART NO.	DESCRIPTION
3-IC1,2	EI-337360	IC μPC4082C
3-IC3,6	EI-349719	IC M5218P
3-IC4,5	EI-362588	IC M5238P
3-IC7	EI-361232	IC CX23035
3-IC8	EI-361233	IC CX20109
3-IC9	EI-361234	IC CX20108
3-IC10	EI-361235	IC CX20133
3-IC11	EI-330352	IC BA6109
3-IC12	EI-362736	IC CXK5816P-15L
3-IC13	EI-304657	IC TC4011BP
3-IC14	EI-361237	IC M50745
3-IC15	EI-355863	IC MB84053B
3-TR1,8,12	ET-310148	⚠ TR 2SD612K E, F
3-TR2,9	ET-322598	⚠ TR 2SB632K E, F
3-TR3,5 to 7, 16,27,31	ET-308141	TR 2SC2603 G F05
3-TR4,10	ET-200986	⚠ TR 2SD863-V8 F
3-TR11,13	ET-318237	⚠ TR 2SB764 E, F
3-TR14	ET-357845	⚠ TR 2SC3242A F, G F05
3-TR15	ET-354841	⚠ TR 2SA1282A F, G F05
3-TR17,29,30	ET-349718	TR 2SA1392 S, T
3-TR18,25	ET-308472	TR 2SA1115 E, F, G F05
3-TR19	ET-354897	TR FET 2SK170 BL, GR, V
3-TR20,21, 26,28	ET-349081	TR 2SC3383 S, T
3-TR22	ET-345625	⚠ TR 2SC3116 S, T
3-TR23,24	ET-345626	⚠ TR 2SA1248 S, T
3-D1,4,9, 13, 14	ED-344280	D SILICON H GMA-01-FY2 F05
3-D2	ED-300035	D ZENER H HZ6 B3
3-D5 to 8,17	ED-331617	D ZENER H HZ6 A3
3-D10 to 12	ED-306109	⚠ D SILICON W03B 100/1.0A
3-D15,16	ED-353692	D VARACTER SVC321 C, D DOUBLE
3-D18,21	ED-301911	D SILICON H DS448
3-D19	ED-319167	D ZENER H HZ6 C3
3-D20	ED-201581	D ZENER H HZ7 B1
3-VS1	ES-344274	⚠ SW SELECTOR HXW0244-01-060 01-4 (U)
3-VR1	EV-356583	R S-FIX H RH0615CN3J 3P 332
3-VR2,3	EV-357619	R S-FIX H RH0615C15J 3P 104
3-VR4	EV-358829	R S-FIX H RH0615CJ4J 3P 223
3-VR5	EV-356577	R S-FIX H RH0615C14J 3P 103
3-VL1	EO-361227	COIL VARI 1 A119AN-16737Z
3-VL2	EO-362920	COIL VARI 1 25-5430-13 WHITE
3-VL3	EO-362921	COIL VARI 1 25-5431-13 RED
3-VL4	EO-362922	COIL VARI 1 25-5432-13 BLACK
3-L1	EO-345913	COIL FIX 1 LAL03KH 100K
3-L2	EO-345902	COIL FIX 1 LAL03KH 1R0M
3-L3	EO-338112	COIL FIX 1 LAL04 100K
3-X1	EI-361222	OSC X'TAL NR-18 8.467200MHz
3-X2	EI-361223	OSC X'TAL NR-18 35.002000MHz
3-X3	EI-349372	OSC CE CSA4.00MG 4MHz
3-C38	EC-307684	C EC V F05 NP SM R47M 50DC
3-C65	EC-362734	C STY V S05 CQ09S2B 222J 125DC
3-C67	EC-347263	C MC V F05 FM 221J 500DC
3-C68	EC-350672	C PP V F05 PP 681J 50DC
3-C69,71	EC-345724	C PP V F05 PP 222J 50DC
3-C70	EC-361245	C PP V F05 PP 272J 50DC
3-C72	EC-361246	C PP V F05 PP 362J 50DC
3-C74,77	EC-362258	C EC CUT SM 682M 10.00DC
3-C90	EC-320548	⚠ C CE V F 103Z 250AC (U, J)
3-C90A	EC-338411	⚠ C CE V FZ 103P 400AC (C, A, E, B, S)
3-C92	EC-362234	C STY V S05 CQ09S2B 221J 125DC
3-C101	EC-305428	C TT V D 3R3M 10DC
3-C108	EC-362235	C PP V F05 PP 103J 50DC
3-J1	EJ-361983	DIN J TPX3204-01-020 8P
	ASSEMBLY BLOCK	
3-F1	EF-601964	⚠ FUSE SEMKO T 1.60A 250V (E, B, S)

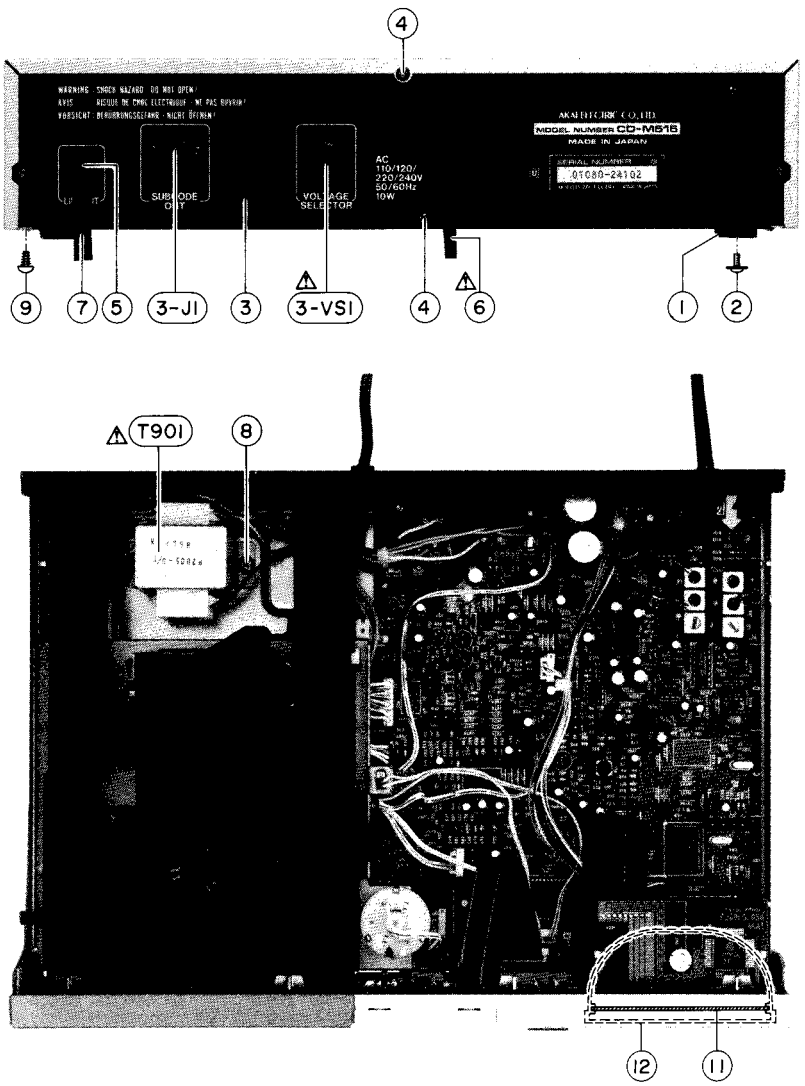
4. OPERATION PC BOARD

REF. NO.	PART NO.	DESCRIPTION
4-TS1 to 12	ES-349474	SW TACT SKHHAM004A

5. LCD PC BOARD

REF. NO.	PART NO.	DESCRIPTION
	LCD PC BOARD	
5-IC1	EI-361230	IC LC7580
	ASSEMBLY BLOCK	
5-IN1	EM-361229	IND LCD 9421P
5-IN2	EL-361231	PL SOCKET 14.0V 100MA

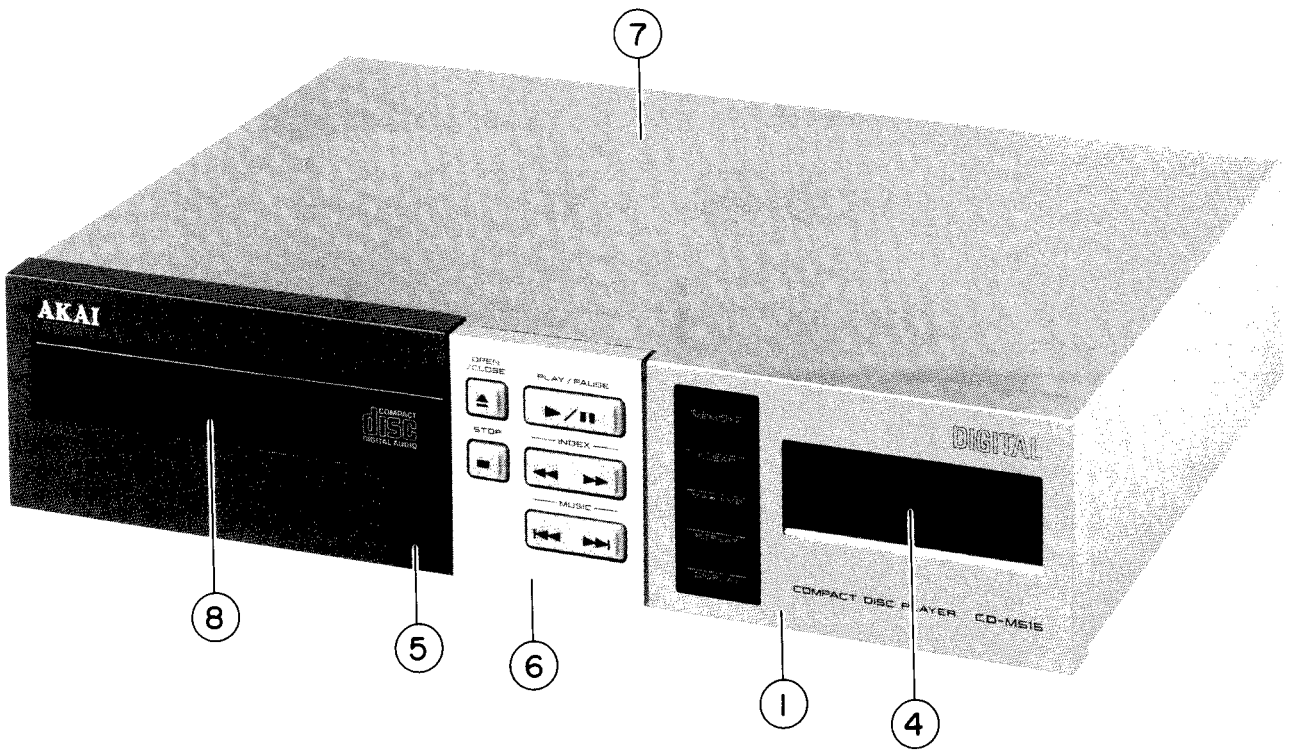
ASSEMBLY BLOCK



6. ASSEMBLY BLOCK

REF. NO.	PART NO.	DESCRIPTION
	ASSEMBLY BLOCK	
6-1	SA-349332	FOOT
6-2	ZS-344754	ST PAN30 × 06STL CMT C080 (FOOT FIX)
6-3	SP-359777B	PANEL REAR CD-M515 (J)
6-3A	SP-359777A	PANEL REAR CD-M515 (U)
6-3B	SP-359777C	PANEL REAR CD-M515 (A, C)
6-3C	SP-359777D	PANEL REAR CD-M515 (E, V)
6-3D	SP-359777E	PANEL REAR CD-M515 (B, S)
6-4	ZS-345272	ST BR30 × 06STL BNI (PANEL REAR FIX)
6-5	SZ-344264	BUSH CORD KF-41
6-6	EW-363595	⚠ AC CORD 200 1165BVFF B070 A J (J)
6-6A	EW-363659	⚠ AC CORD 200 0129AVFF B070 A U/T (U)
6-6B	EW-363801	⚠ AC CORD 200 0238PSPT1 B070 A UC (C, A)
6-6C	EW-363672	⚠ AC CORD 200 0364 LCFL B070 A EV (E)
6-6D	EW-363684	⚠ AC CORD 200 LCFL B070 A B (B)
6-6E	EW-363698	⚠ AC CORD 200 0436 LCFL B070 A S (S)
6-7	EW-364137	CORD SAE-047 3P AUDIO CORD (EXCEPT A)
6-7A	EW-364139	CORD SAE-046 3P AUDIO CORD UL (A)
6-8	ZS-304022	ST PAN40 × 06STL CMT (TRANS POWER FIX)
6-9	ZS-320906	ST BR30 × 06STL CMT (COVER UPPER FIX)
6-10x	ZS-336388	PT BR26 × 06STL (HOLDER LCD FIX)
6-11	SZ-362620	FILTER LCD
6-12	SZ-359773	HOLDER LCD
6-T901	BT-361202	⚠ TRANS POWER P2005-J (J)
6-T901A	BT-361201	⚠ TRANS POWER P2005-U/T (U)
6-T901B	BT-361204	⚠ TRANS POWER P2005-A, C (C, A)
6-T901C	BT-361205	⚠ TRANS POWER P2005-E, V (E)
6-T901D	BT-361206	⚠ TRANS POWER P2005-B, S (B, S)
6-SW901	ES-337902	⚠ SW PUSH SDLD1P002 01-1
	MAIN PC BOARD	
3-VS1	ES-344274	⚠ SW SELECTOR HXW0244-01-060 01-4 (U)
3-J1	EJ-361983	DIN J TPX3204-01-020 8P

FINAL ASSEMBLY BLOCK



7. FINAL ASSEMBLY BLOCK

REF. NO.	PART NO.	DESCRIPTION
7-1	BD-P2005A040A	PANEL FRONT BLK CD-M515
7-1B	BD-P2005A040B	PANEL FRONT BLK CD-M515-B
7-2x	ZS-320906	ST BR30 x 06STL CMT (PANEL FRONT FIX)
7-3x	ZS-200676	T2CTS30 x 06STL CMT (PANEL FRONT FIX)
7-4	SZ-359750	WINDOW LCD
7-5	SK-359753	KNOB POWER
7-6	SK-359751A	PANEL SASH
7-6B	SP-359751B	PANEL SASH-B
7-7	SP-359776A	COVER UPPER
7-7B	SP-359776B	COVER UPPER-B
7-8	SP-361086A	PANEL TRAY
7-8B	SP-361086B	PANEL TRAY-B
7-9x	ZS-350934	PT BR30 x 08STL BNI (PANEL TRAY FIX)

Symbol for color variation
Non: Standard color
B: Black

INDEX

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ED-344280	3-D13	ET-354897	3-TR19				
ED-344280	3-D14	ET-357845	3-TR14				
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AKAI

MODEL CD-M515

SCHEMATIC DIAGRAM AND PC BOARD

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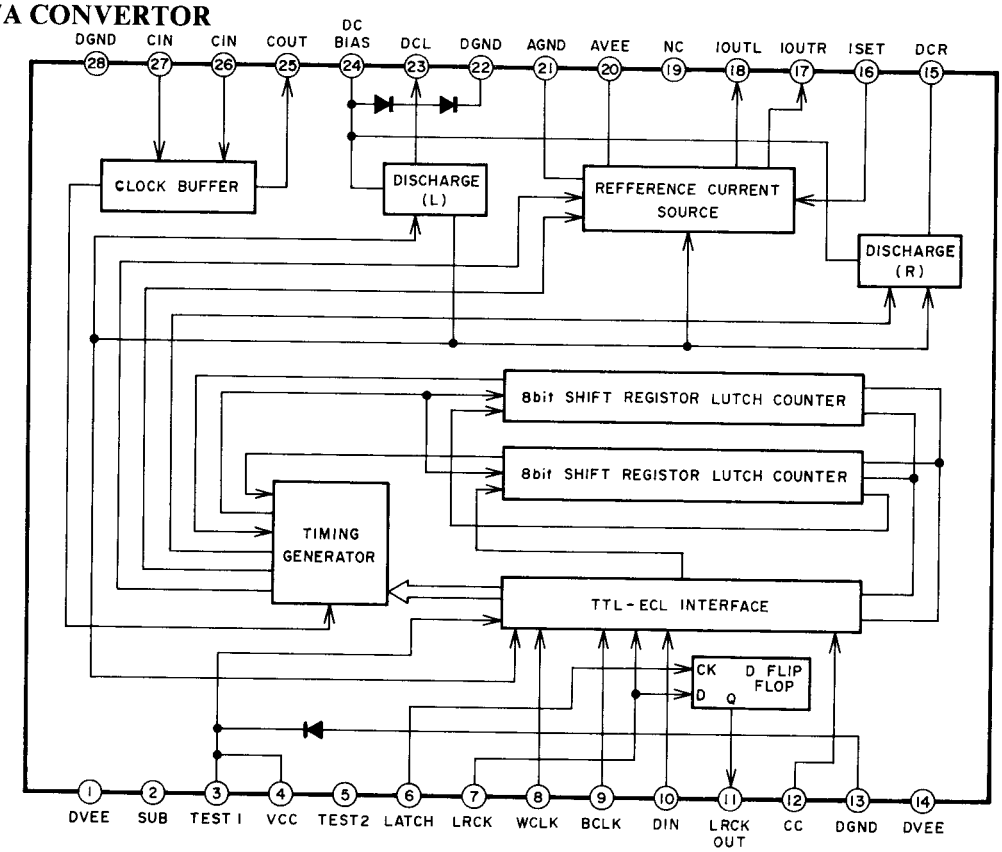
PURPOSE OF EACH IC's

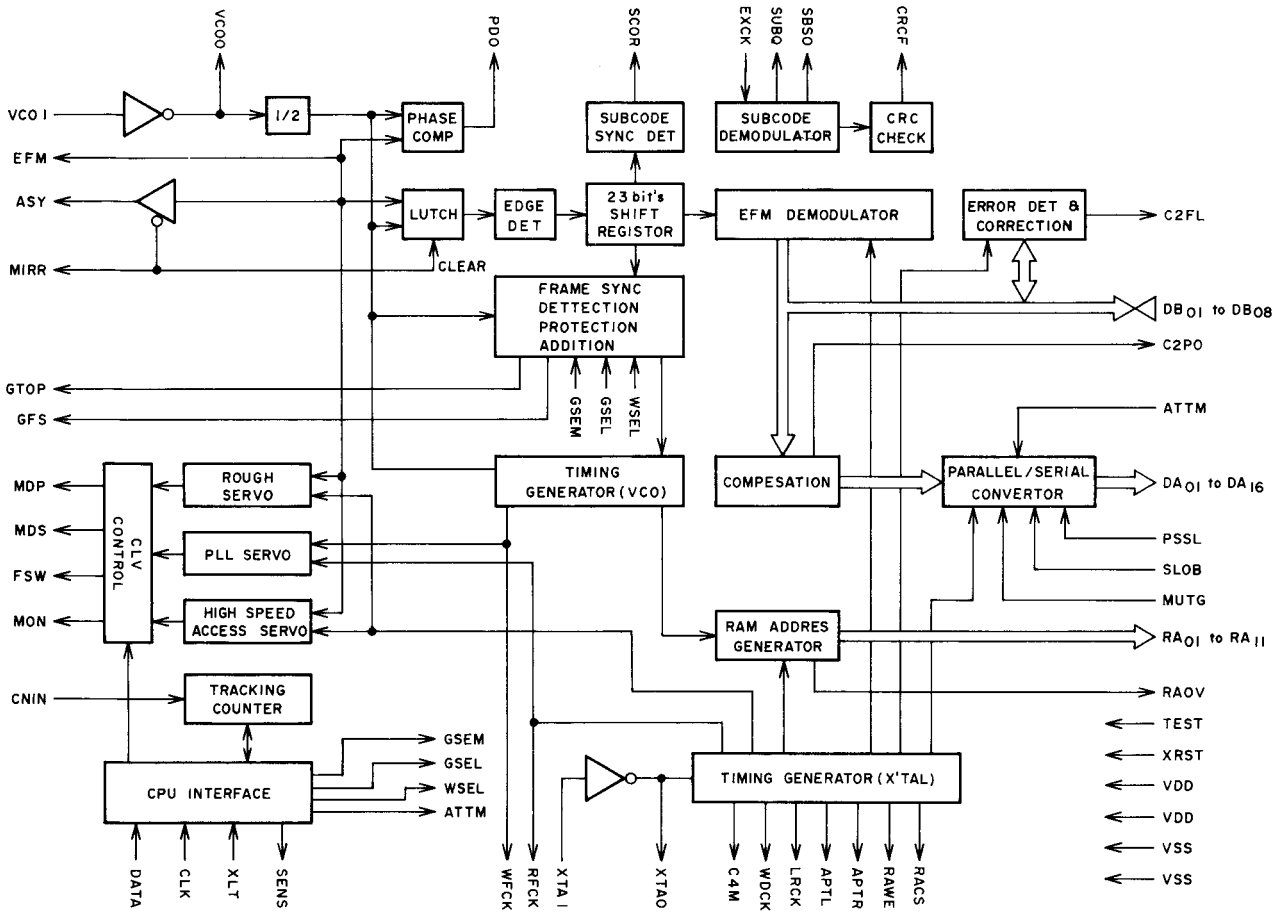
IC No.	NAME OF IC's	PURPOSE
IC1, 2	MPC4082C	DUAL LOW NOISE OPERATIONAL AMPLIFIER
IC3, 6	M5218P	DUAL LOW NOISE OPERATIONAL AMPLIFIER
IC4, 5	M5238P	DUAL LOW NOISE OPERATIONAL AMPLIFIER
IC7	CX23035	EFM DEMODULATOR, ERROR DETECTION AND CORRECTION FRAME SYNC DETECTION, SUB CODE DETECTION AND DEMODULATION, SPINDLE MOTOR SERVO
IC8	CX20109	RF AMPLIFIER
IC9	CX20108	SERVO SIGNAL PROCESSER
IC10	CX20133	16 BIT D/A CONVERTOR
IC11	BA6109	LOADING MOTOR CONTROL
IC12	CXK5816P-15L	16K BIT RANDAM ACCESS MEMORY
IC13	TC4011BP	NAND GATE
IC14	M50745	SYSTEM CONTROL (8 BIT MICROCOMPUTER)
IC15	MB84053B	TRIPE-2 CHANNEL MULTIPLEXER/DEMULTIPLEXER

IC BLOCK DIAGRAM
CX20133
16 Bits D/A CONVERTOR



CX20133

Pin No.	Symbol	Description	
1	DVEE	−5V	
2	SUB	Substrate −5V, same level as DVEE	
3	TEST 1	NC	
4	VCC	+5V	
5	TEST 2	NC	
6	LATCH	Clock input for D-Flip Flop	
7	LRCK	L-ch, R-ch clock, "Low" R-ch, "High"L-ch	
8	WCLK	Word Clock	
9	BCLK	Bit Clock	
10	DIN	Data In	
11	LRCK OUT	L-ch, R-ch Clock Out	
12	CC	Conversion command input	
13	DGND	Digital GND	
14	DVEE	−5V	
15	DCR	R-ch discharge control signal out	LRCK"HIGH"
16	ISET	Current set control signal for IOUTR, IOUTL	
17	IOUTR	R-ch current signal OUT	LRCK "HIGH"
18	IOUTL	L-ch current signal OUT	LRCK "LOW"
19	—	NC	
20	AVEE	−5V	
21	AGND	Analog GND	
22	DGND	Digital GND	
23	DCL	L-ch discharge control signal out	LRCK "LOW"
24	DC BIAS	DC Bias for discharge (2.5 mA)	
25	COUT	Clock Out	
26	CIN	Clock In	
27	$\overline{\text{CIN}}$	Clock In	
28	DGND	Digital GND	



CX23035

Pin No.	Symbol	I/O	Description
1	FSW	O	Spindle motor filter switching control
2	MON	O	Spindle motor ON/OFF control
3	MDP	O	Spindle motor speed and phase control
4	MDS	O	Spindle motor speed control
5	EFM	I	EFM signal input
6	ASY	O	EFM signal slice level control
7	MIRR	I	MIRR signal input "L" on track "H" mirror
8	VCOO	O	VCO output f = 8.6436 MHz
9	VCOI	I	VCO input
10	TEST	I	0V (GND)
11	PDO	O	Phase comp. output
12	VSS	—	GND (0V)
13	CLK	I	Clock signal from CPU
14	XLT	I	Lutch signal from CPU
15	DATA	I	Serial data from CPU
16	XRST	I	RESET input "L" reset
17	CNIN	I	Tracking pulse input (+5V)
18	SENS	O	Output of CPU interface
19	MUTG	I	Mute control signal input
20	CRCF	O	CRC check output of the subcode Q "L" detect error
21	EXCK	I	Not used
22	SBSO	O	Not used
23	SUBQ	O	Subcode Q output
24	SCOR	O	Subcode sync detection output
25	WFCK	O	Not used (Write frame clock)
26	RFCK	O	Not used (Read frame clock)
27	GTOP	O	Frame sync detection output
28	GFS	O	"H" frame sync lock "L" frame sync unlock

Pin No.	Symbol	I/O	Description
29	DB08	I/O	Data 8 (MSB)
30	DB07	I/O	Data 7
31	DB06	I/O	Data 6
32	DB05	I/O	Data 5
			Data Bus line for the EXT. RAM (CXK5816P-15L)
33	VDD	—	+5V
34	DB04	I/O	Data 4
35	DB03	I/O	Data 3
36	DB02	I/O	Data 2
37	DB01	I/O	Data 1 (LSB)
			Data Bus line for the EXT. RAM (CXK5816P-15L)
38	RA01	O	ADDR01 (LSB)
39	RA02	O	ADDR02
40	RA03	O	ADDR03
41	RA04	O	ADDR04
42	RA05	O	ADDR05
43	RA06	O	ADDR06
44	RA07	O	ADDR07
45	RA08	O	ADDR08
46	RA09	O	ADDR09
47	RA10	O	ADDR10
48	RA11	O	ADDR11 (MSB)
			Address signal output for the EXT. RAM (CXK5816P-15L)
49	RAWE	O	Write enable signal output "L" active
50	RACS	O	Chip select signal output "L" active
51	C4M	O	Not used
52	VSS	—	GND (0V)
53	XTAI	I	X'TAL OSC. input f = 8.4672 MHz
54	XTAO	O	X'TAL OSC. output f = 8.4672 MHz
55	C2FL	O	Monitor of error detection *
56	C2PO	O	Not used
57	RAOV	O	Not used
58	SLOB	I	0V (GND)
59	PSSL	I	0V (GND)
60	APTR	O	Not used
61	APTL	O	Not used
62	DA01	O	C1F1 *
63	DA02	O	C1F1 *
64	DA03	O	C2F1 * Not used
65	DA04	O	C2F2 * Not used
66	DA05	O	UGFS Not used
67	DA06	O	$\overline{\text{WFCK}}$ INV write frame clock signal output
68	DA07	O	Not used FCKV 1/4 or 1/8 WFCK output
69	DA08	O	Not used FCKX 1/4 or 1/8 RFCK output
70	DA09	O	Not used $\overline{\text{PLCK}}$ 1/2 VCO output
71	DA10	O	Not used $\overline{\text{LRCK}}$ INV. LRCK (Pin 80)
72	DA11	O	Not used C4LR 176.4 kHz strobe signal output
73	VDD	—	+5V
74	DA12	O	Not used $\overline{\text{DENL}}$ L-ch serial data enable signal
75	DA13	O	Not used $\overline{\text{DENR}}$ R-ch serial data enable signal
76	DA14	O	$\overline{\text{C210}}$ INV. C210 (Pin 77)
77	DA15	O	Not used C210 Bit clock f≒2.1168 MHz
78	DA16	O	Data output
79	WDCK	O	Worde clock output 88.2 kHz strobe signal
80	LRCK	O	L-ch, R-ch clock output 44.1 kHz strobe signal

* Monitor Signal refer to Fig. 1 & Fig. 2

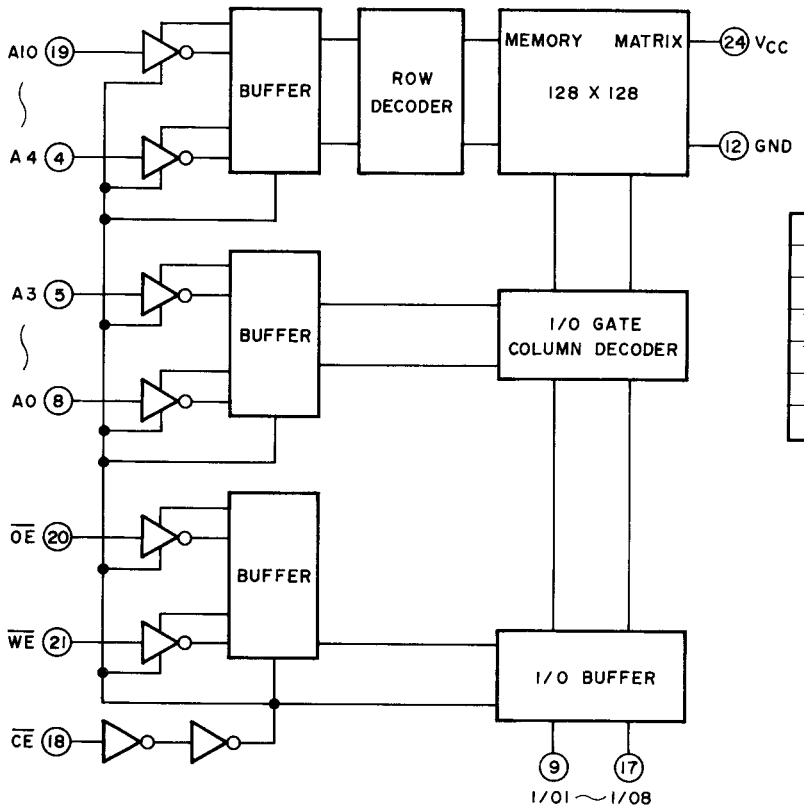
C1F1	C1F2	C1 Correction
O	O	No error
I	O	Signal error correction
O	I	Double error correction
I	I	Irretrievable error

Fig. 1

C2F1	C2F2	C2FL	C2 Correction
O	O	O	No error
I	O	O	Signal error correction
O	I	O	Double error correction
I	I	I	Irretrievable error

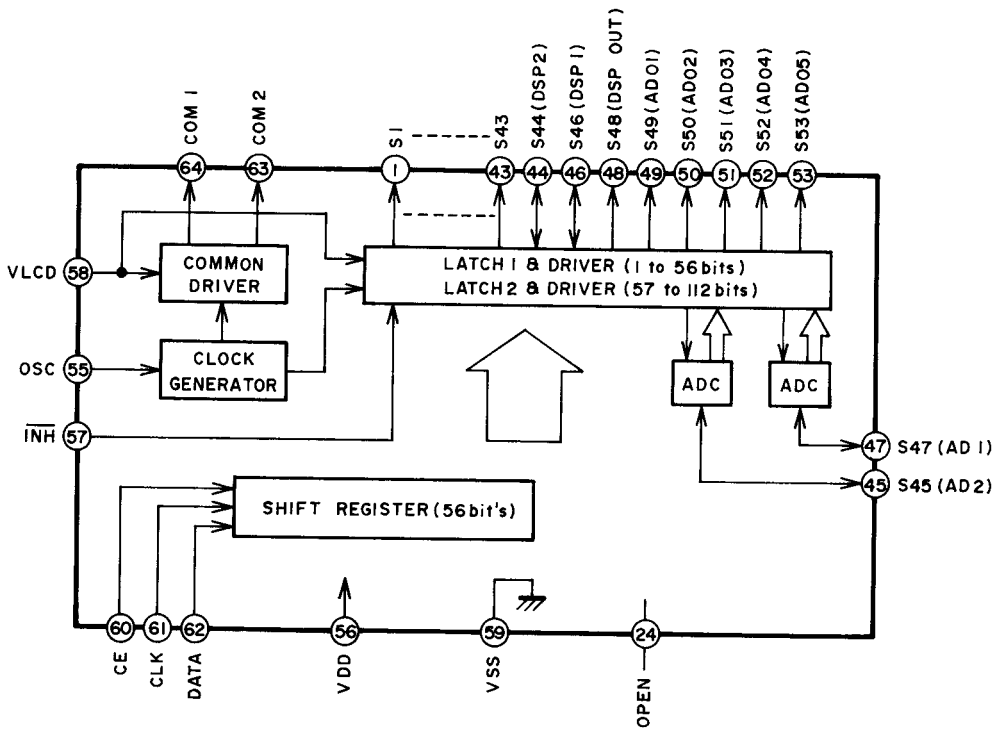
Fig. 2

CXK5816P-15L



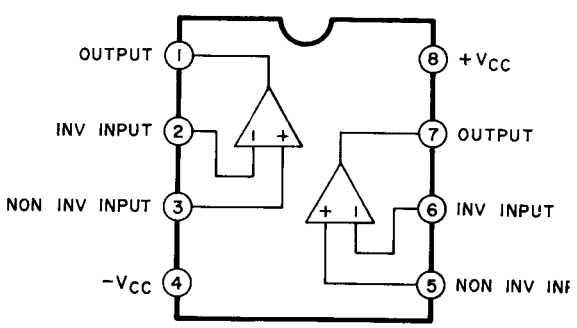
A0 ~ A10	Address input
I/O1 ~ I/O8	Data IN/OUT
$\overline{CE}$	Chip enable signal input
$\overline{WE}$	Write enable signal input
$\overline{OE}$	Output enable signal input
Vcc	+5V
GND	GND

LC7580

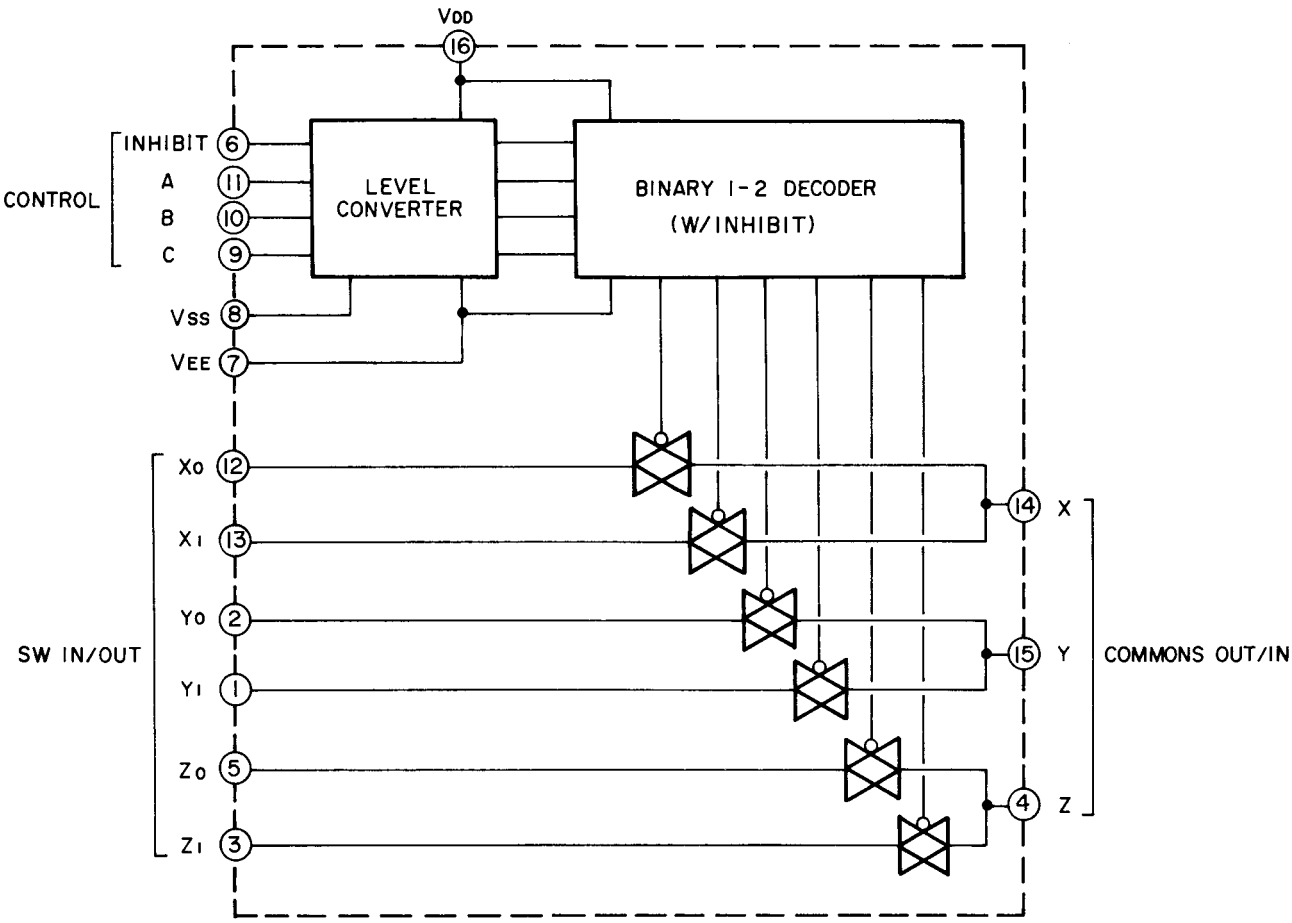


S1 ~ S43	Segment drive Output
S46 (DSP), S44 (DSP2)	Segment drive Output/DSP Input
S47 (AD1), S45 (AD2)	Segment drive Output/AD Input
S48 (DSP OUT)	Segment drive Output/DSP Output
S49 ~ S53	Segment drive Output/AD Output
COM 1, 2	Common Output
V LCD	LCD Bias voltage
OSC	OSC control
CE, CLK. Data	Serial data Input
VSS, VDD	GND, +5V
$\overline{\text{INH}}$	Display OFF signal Input
Open	Not used

M5218P, M5238P, μPC4082C



MB84053

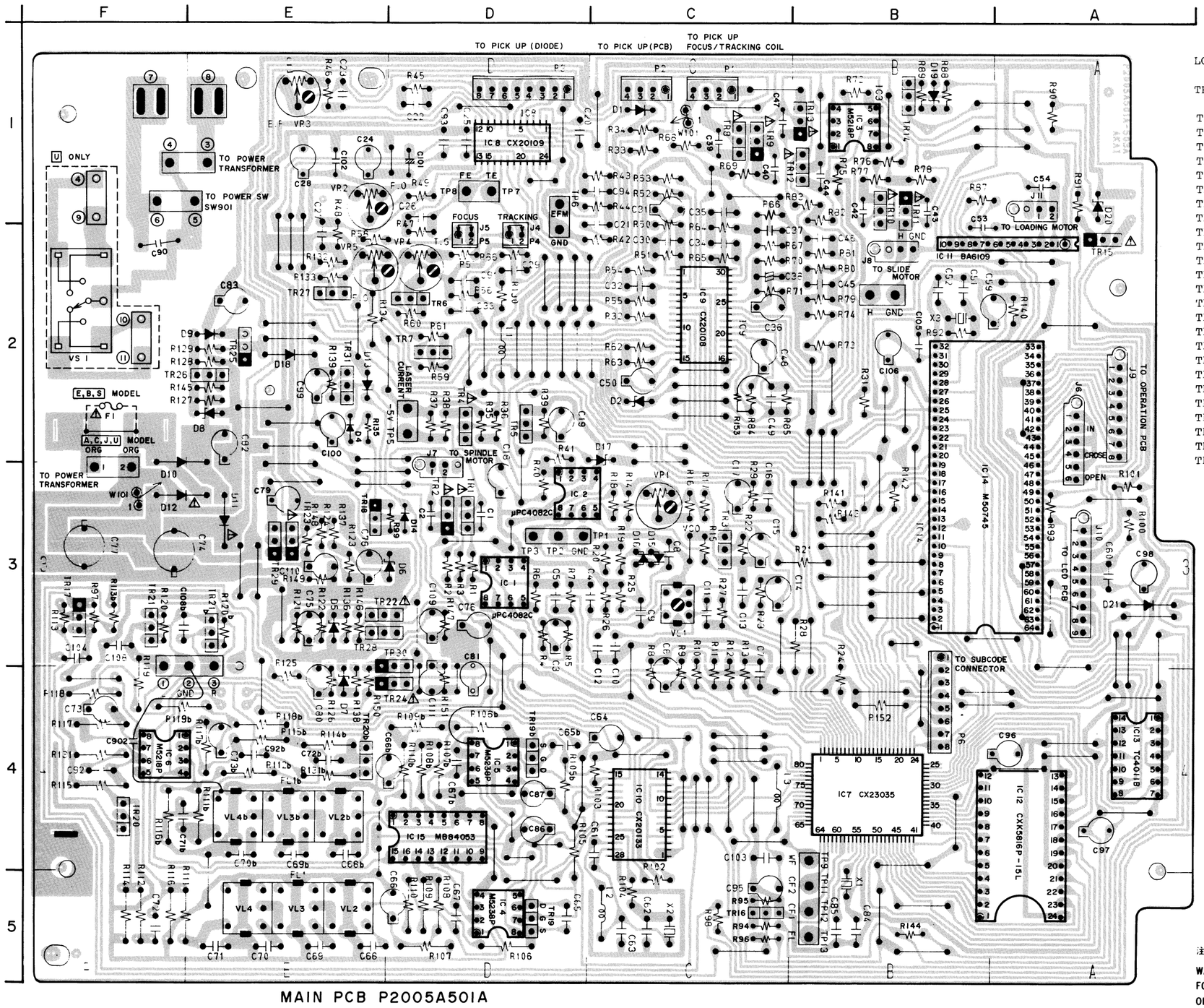


Controls				"ON" channel		
INH	C	B	A			
0	0	0	0	Z_0	Y_0	X_0
0	0	0	1	Z_0	Y_0	X_1
0	0	1	0	Z_0	Y_1	X_0
0	0	1	1	Z_0	Y_1	X_1
0	1	0	0	Z_1	Y_0	X_0
0	1	0	1	Z_1	Y_0	X_1
0	1	1	0	Z_1	Y_1	X_0
0	1	1	1	Z_1	Y_1	X_1
1	–	–	–	None		

M50745

Pin No.	Symbol	Description
1	$P4_2$	Not used
2	$P4_1$	
3	$P4_0$	Not used
4	$P2_7$	Write focus clock input
5	$P2_6$	Sens signal input
6	NC	Not used

Pin No.	Symbol	Description
7	NC	Not used
8	NC	Not used
9	SCOR	Subcode detection signal input
10	FOK	Focus servo "OK" signal input
11	GFS	"H" frame sync lock "L" frame unlock
12	GTOP	Frame sync detection signal input
13	CRCF	CRC check signal input
14	SUBQ	Subcode Q input
15	MUTG	Mute control signal output
16	CLK	Clock signal output
17	DATA	Data signal output
18	SIN	Not used
19	XLT	Lutch signal output
20	DIRC	Track jamp control signal output "H" normal, "L" track jamp
21	SCGT	Subcode gate signal output
22	WFGT	Write frame gate signal output
23	CNTR	Sens signal input from IC7
24	$\overline{INT_1}$	Sens signal input from IC13
25	$\overline{INT_2}$	Sens signal input from IC7
26	CNVss	0V (GND)
27	$\overline{RESET}$	Reset signal input
28	XIN	Clock input
29	XOUT	Clock output
30	ϕ	Not used
31	$\overline{RESET\ OUT}$	Reset signal output
32	Vss	0V (GND)
33	$P5_7$	Not used
34	$P5_6$	Not used
35	$P5_5$	Key input (Skip ⏮, display)
36	$P5_4$	Key input (Stop, skip ⏭)
37	$P5_3$	Key input (Search ◀◀, repeat)
38	$P5_2$	Key input (Open/Close, Clear)
39	$P5_1$	Key input (Search ▶▶, MA ⟷ MB)
40	$P5_0$	Key input (Play/pause, Program)
41	PI_7	Data strobe out for operation key
42	PI_6	
43	PI_5	0V (GND)
44	PI_4	Not used
45	PI_3	Pick up block in switch input
46	PI_2	Not used
47	PI_1	Disk tray close switch input
48	PI_0	Disk tray open switch input
49	LASER	Laser control signal output
50	EMP	Emphasis control signal output
51	KICK	Not used
52	$P\phi_4$	Not used
53	SYNC 1	Not used
54	SYNC 0	Synchronize signal output
55	LD OUT	Loading motor out control signal
56	LD IN	Loading motor in control signal
57	NC	Not used
58	NC	Not used
59	VCC	+5V
60	$\overline{INH}$	Display off signal output
61	OE	Serial data output for display
62	LCLK	
63	LCDATA	
64	$P4_3$	Not used



MAIN PCB P2005A501A

LOCATION OF COMPONENTS

TR'S

TR1.....D3
TR2.....D3
TR3.....C3
TR4 to 7.....D2
TR8.....C1
TR9.....C1
TR10 to 14....B1
TR15.....A1
TR16.....C5
TR17.....F3
TR18.....E3
TR19.....D5
TR19b.....D4
TR20.....F4
TR20b.....E4
TR21.....F3
TR21b.....E3
TR22.....D,E3
TR23.....E3
TR24.....D,E4
TR25 to 27....E2
TR28.....D,E3
TR29.....E3
TR30.....D,E4
TR31.....E2

CONNECTOR'S

P1,2.....C1
P3.....D1
P6.....B4
J6.....A2
J7.....D3
J8.....B1
J9.....A2
J10.....A3
J11.....A1

IC'S

IC1,2.....D3
IC3.....B1
IC4.....D5
IC5.....D4
IC6.....F4
IC7.....B4
IC8.....D1
IC9.....C2
IC10.....C4
IC11.....AB1
IC12,13....A4
IC14.....AB3
IC15.....D4

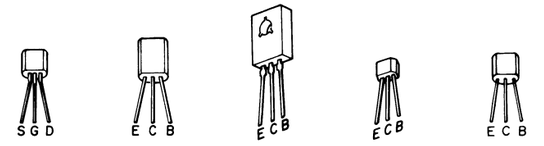
TR1,8,12.....2SD612K (E,F)
TR2,9.....2SB632K (E,F)
TR3,5,6,7,16,27,31.....2SC2603 (E,F)
TR4,10.....2SD863 (E,F)
TR11,13.....2SB764 (E,F)
TR14.....2SC3242A (F,G)
TR15.....2SA1282A (F,G)
TR17,29,30.....2SA1392 (S,T)
TR18,25.....2SA1115 (E,F)
TR19,19b.....2SK170 (BL,GR)
TR20,20b,21,21b,26,28....2SC3383 (S,T)
TR22.....2SC3116 (S,T)
TR23,24.....2SA1248 (S,T)

調整ボリューム及びコイル

VR1：VCO(電圧制御オシレイター)
VR2：フォーカスオフセット
VR3：EFバランス(トラッキングエラー)
VR4：トラッキングゲイン
VR5：フォーカスゲイン
VL1：VCO 周波数

ADJUSTMENT VOLUMES & COIL

VR 1 : VCO (VOLTAGE CONTROLED OSCILLATOR)
VR 2 : FOCUS OFF-SET
VR 3 : EF BALANCE (TRACKING ERROR)
VR 4 : TRACKING GAIN
VR 5 : FOCUS GAIN
VL 1 : VCO FREQUENCY



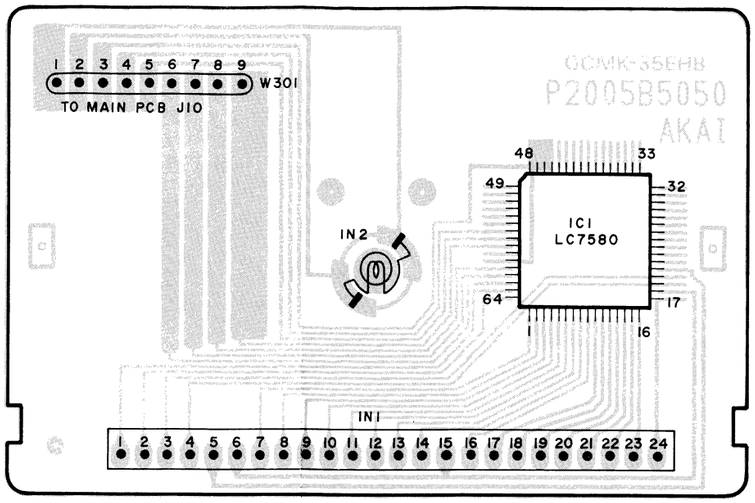
2SK170
2SD863 2SB764 2SC3242A 2SA1282A
2SD612K 2SB632K 2SC3116 2SA1248
2SC2603 2SA1115
2SA1392 2SC3383

注意：△の付された部品は、安全上重要部品です。交換の際は、指定部品以外は使用しないこと。

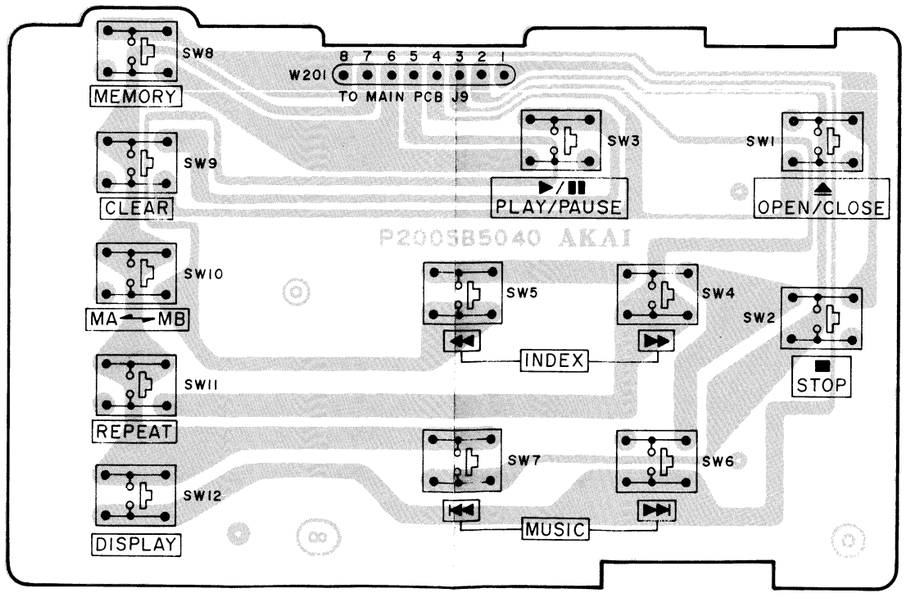
WARNING: △ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: △ IL INDIQU LES COMPOSANTS CRITIQUES DE SURETE POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

B
• • • = NPN TRANSISTOR
B
• • • = PNP TRANSISTOR



LCD PCB P2005B5050

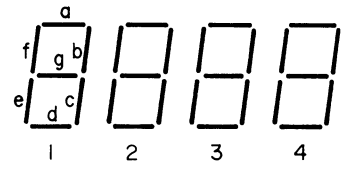


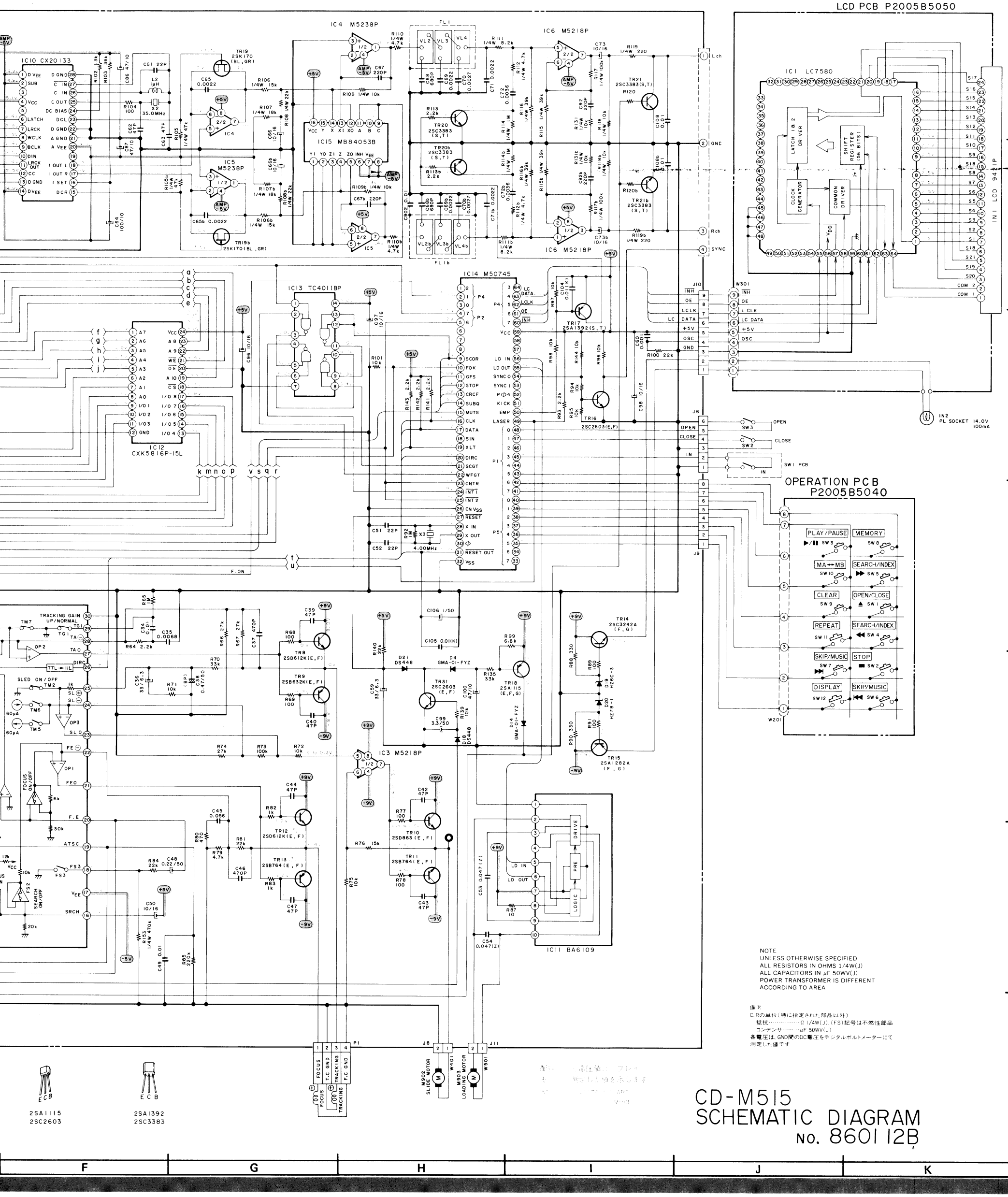
OPERATION PCB P2005B5040

SUBCODE OUT JACK
J1
WFCK MUTG CRCF GND EXCK SBSO SUBQ SCOR
WHT PER BLU GRY BRN RED ORG YLW
M901 SPINDLE MOTOR
W601
J7
TR1 2SD612K (E, F)
TR2 2SB632K (E, F)
IC1 μPC4082C
IC2 μPC4082C
TR3 2SC2603 (E, F)
TR4 2SD863(E, F)
TR5 2SC2603 (E, F)
TR22 2SC3116(S, T)
TR23 2SA1248(S, T)
TR24 2SA1248 (S, T)
TR25 2SA1115 (E, F)
TR26 2SC3383 (S, T)
TR27 2SC2603 (E, F)
TR28 2SC3383 (S, T)
TR29 2SA1392 (S, T)
TR6, 7 2SC2603(E, F)
P2
REF LEVEL
PHOTO. D
GND
LASER. D
PICK UP
LD
PD
P3
+5V
DIODE A
DIODE B
DIODE D
DIODE C
GND
DIODE F
DIODE E
K55-1218
PICK UP
IC8 CX20109
FOCUS OK COMP.
VOLTAGE REFERENCE
CURRENT REFERENCE
AUTO ASY. CONTROL AMP
FOCUS OK AMP
RF SAMING AMP
RF COMP.
MIRROR AMP
MIRROR OP AMP
PEAK & BOTTOM BUFFER
MIRROR HOLD AMP
MIRROR COMP
FOCUS ERROR AMP
TRACKING ERROR AMP
RF I-V AMP(1)
RF I-V AMP(2)
E I-V AMP
F I-V AMP
IC7 CX23035
FSW MON MDP MDS EFM ASY MIRR VCO O VCO I TEST PDD VSS CLK XLT DATA XRST CNIN SENS MUTG CRCF EXCK SBSO SUBQ SCOR
XTAL 8.4672MHz
IC10 CX20133
D VEE SUB VCC LATCH LRCK WCLK BCLK DIN LRCK OUT CC D GND D VEE
D GND C IN C IN C OUT DC BIAS DCL D GND A GND A VEE I OUT L I OUT R I SET DCR
L3 10μH
IC12 CXK5816P-15L
A7 A6 A5 A4 A3 A2 A1 A0 I/O1 I/O2 I/O3 GND
Vcc A8 A9 WE OE A10 CS I/O8 I/O7 I/O6 I/O5 I/O4
IC9 CX20108
8 BITS S/R
IIL LOGIC
TTL → IIL
IIL → TTL
COMPARATOR 1
COMPARATOR 2
COMPARATOR 3
COMPARATOR 4
OP1
OP2
OP3
OP4
TRACKING GAIN UP/NORMAL
SLED ON/OFF
FOCUS ON/OFF
FOCUS UP/DOWN
SEARCH ON/OFF
TRACKING ON/OFF
TI P2005-U
J, E, B S, C, A
U
AC100V 50/60Hz
AC220V 50Hz
AC240V 50Hz
AC120V 60Hz
AC110 to 240V 50/60Hz
POWER SW
SW901
FUSE E, B, S ONLY
F1 1.6A 250V
VS1
110V 120V 220V 240V
C90 U, J 103Z C, A, E, B, S 103P
MAIN PCB P2005A501A
B (POWER SUPPLY) LINE
B(電源供給)ライン
2SK170
2SB764 2SC1282A 2SC3242A 2SD863
2SA1248 2SB632K 2SC3116 2SD612K
2SA1115 2SC2603
2SA1392 2SC3383

EXPLANATION OF LCD.

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
COM1	COM	—	▶	M-A M-B	INDIVI-DUAL	RE-PEAT	1d	1e	1f	1g	2d	2e	2f	2g	—	3d	3e	3f	3g	4d	4e	4f	4g	INDEX NO.
COM2	—	COM	▮▮	PRO-GRAM	TOTAL	—	—	1c	1a	1b	—	2c	2a	2b	MUSIC NO.	—	3c	3a	3b	—	4c	4a	4b	MIN SEC





NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50WV(J)
POWER TRANSFORMER IS DIFFERENT
ACCORDING TO AREA

備考
C.Rの単位(特に指定された部品以外)
抵抗……Ω 1/4W(J),(FS)記号は不燃性部品
コンテンサ……μF 50WV(J)
各電圧は、GND間のDC電圧をデジタルボルトメーターにて測定した値です

CD-M515
SCHEMATIC DIAGRAM
No. 860112B 3

VCO IN
MDP
80 PIN LRCK
79 PIN WDCK
TPI1
TPI3
TP9
44.1KHz STROB
88.2KHz STROB
1.4MHz
DATA
WHEN FRAM SYNC IS LOCKED
f = 7.35KHz
IC7 CX23035
IC10 CX20133
SPINDLE MOTOR ON/OFF CONTROL
FILTER T/C CHANGE CONT.
IC1: μPC4082C
TR1,2
SPINDLE MOTOR DRIVER
+9V
-9V
J7
M901
SPINDLE MOTOR
21 PIN WE
18 PIN CS
VCO FREQ. CONTROL
DI5,16,VL1
VCO
VCO FREQ.
VRI VCO
COMP.
1/2IC2 μPC4082C
TR3
TP2
FRAM SYNC LOCK→"ON"
R23
CI4
CI3
R22
PARALLEL/SERIAL CONVERTOR
FILTER
PHASE CONT
SPEED CONT
CLV CONTROL
EFM
ASSY
LUTCH
EDGE DETECT
MIRROR
23BIT SHIFT REGISTER
1/2
PDO
PHASE COMPARATOR
X'TAL TIMING GENERATOR
XI 8.4672MHz
f=44.1KHz CLOCK
Vss
CLK
XLT
DATA
XRST
CPU INTERFACE
TRACKING COUNTER
VCO TIMING GENERATOR
RAM ADRESS GENERATOR
IC12 CXK5816P
WE
CS
11bit ADDRESS BUS
16K bit RAM
8bit DATA BUS
CI6,17 R28,29
LPF
MUTE CONT FROM IC14
MUTG
CRC CHECK
EXCK
SBSO
SUBQ
SUB CODEQ
BCOR
SUB CODE DEMODULATOR
EFM DEMODULATOR
FRAM SYNC DETEDT
GTOP
+5V
1/3 PICK UP BLK
LAZER MONITOR DIODE
-5V
MONITOR
G N D
LAZER
P2
APC CIRCUIT
TR4
DRIVE
1/2IC2 μPC4082C
COMP
TR5
TP4
TP5
LAZER ON/OFF CONTROL
L-LAZER DIODE "ON"
8 PIN
2 PIN
1 PIN
4 PIN
IC8 CX20109
"H" WHEN ENVELLOPE IS MORE THEN 0.6V
FOCUS OK COMP.
FOCUS OK AMP
RF COMP.
EYE PATTERN
TP6
Vcc
DVcc
EFM SLICE LEVEL CONTROL
2/3 PICK UP BLOCK
P3
+5V
A
B
C
D
GND
F
E
FOCUS ERROR AMP
MIRROR OUT
E I-V AMP
R45
VR3 EF BALANCE
R46
TRACKING ERROR AMP
F I-V AMP
R132
R133
R49
TR27
TP7
TP8
P4
P5
FOCUS OFF-SET
"ON" WHEN FOCUS ON
VR5 FOCUS GAIN
HPF
VR4 TRACKING GAIN
TR22,28
+5V REG.
DII
C74
C78
TR23,29
-5V REG.
DI2
TR24,30
AMP -5V
IC9 CX20108
HF GAIN CORRECT.
HF CORRECTION
FB
SLIDE ON/OFF
C36
LPF
RESET FROM IC14
DATA
XLT
CLK
MIRROR
TZC
Vcc
FOCUS ON/OFF
TRACKING ON/OFF
SEARCH ON/OFF
ATSC (ANTI SHOCK)
C50
TR12,13
FOCUS COIL DRIVER
MAIN PCB P2005A501A
EFM
MIRROR
T.E OUT
F.E OUT
AT SEARCH

CD-M515 BLOCK DIAGRAM NO. 860113B

TP11
TP13
X'TAL
LRCK OUT
FL1
⑦ PIN

IC10 CX20133
UPPE 8BIT SHIFT REGISTER, LUCH.COUNTER
LOWER 8BIT SHIFT REGISTER LUCH.COUNTER
TTL-ECL INTERFACE
DISCHARGE (L)
DISCHARGE (R)
TIMING GEN.
CK D Q
f=44.1KHz CLOCK
XI 8.4672MHz
TR19
C65
LCH INTEGRATOR
1/2 IC4 M5238P
TR19b
C65b
1/2 IC5 M5238P
INTEGRATOR
IC15 MB4053B
A B C LOGIC CONT.
INH
VEE VSS
+5V
2/2 IC4 M5238P
S/H
VL2,3,4
LPF
R111
C67
1/2IC6 M5218P
AMP
L CH OUTPUT
R112,C72
DEEMPHASIS
CHANGE THE DEEMPHASIS
50μS
15μS
TR20
R114
TR20b
R114b
GND
C67B
-5V
VL2b, 3b, 4b
R111b
2/2IC6 M5218P
R CH OUTPUT
SYNC
⑨ PIN
⑧ PIN
⑦ PIN
OSC
IC12 CXK5816P-15L
11bit ADDRESS BUS
16K bit RAM
WE
CS
IC13 TC4011BP
IC14 M50745-412SP
SENS
SCOR
FOK
GFS
GTOP
CRCF
SUBQ
MUTG
CLK
DATA
XLT
DIRC
SCGT
WFGT
CNTR
INT1
INT2
RESET
XIN
XOUT
RESET OUT
Vss
S.TRANSFER CLOCK
SUB CODEQ
MUTE CONT.
DISPLAY DATA,CLOCK etc
LD IN
LD OUT
SYNCO
EMP
KEY IN
STROBE OUT
KEY RETURN
TR16
TR17
INV
RESET CIRCUIT
X3 4MHz
RESET SIGNAL FOR IC7 & IC9
IC1 LC7580
CLOCK GENERATOR
SHIFT REGISTER 56bit
LATCH DRIVER
COMMON DRIVER
INH
OE
LCLK
LCDATA
SI
S21
COM1
COM2
LCD
P10
IN2
LCD PCB. P2005B5050
P6
SW3
SW2
SW1
OPEN
CLOSE
IN
P9
KEY MATRIX
OPERATION PCB P2005B5040
IC11 BA6109
LOADING MOTOR CONTROL & DIVE
LOGIC
PRE
DRIVE
R87
J11
M903
LOADING MOTOR
HF CORRECTION
FB
TRACKING COIL DRIVER
TR8,9
C36
LPF
1/2IC3,TR10,11
SLIDE MOTOR DRIVER
TP14
FOCUS COIL DRIVER
TR12,13
FOCUS ON/OFF
TRACKING ON/OFF
ATSC (ANTI SHOCK)
SEARCH ON/OFF
C50
P1
J8
M902
SLIDE MOTOR
F.COIL
GND
TRK COIL
GND
FOCUS COIL
TRACKING COIL
3/3PICK UP BLK
PCB P2005A501A

⑤ ⑥	② ⑩	MOTOR DIRECTION
H H	BRAKE	—
L H	L H	LOADING
H L	H L	UNLOADING
L L	OPEN	STOP

F.E OUT
AT SEARCH ◀◀
TP14
㉓ PIN
AT SEARCH ▶▶
TP14
㉓ PIN
X'TAL IN